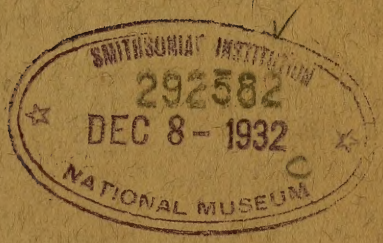
REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

1932

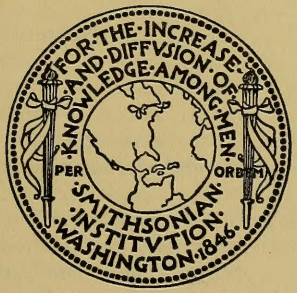


SMITHSONIAN INSTITUTION
WASHINGTON
D. C.

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1932



(Publication 3183)

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1932

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[1] In part govermentally supported.

THE SMITHSONIAN INSTITUTION

June 30, 1932

Presiding officer ex officio.—HERBERT HOOVER, President of the United States.
Chancellor.—CHARLES EVANS HUGHES, Chief Justice of the United States.
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Curators.—Paul Bartsch, Ray S. Bassler, Theodore T. Belote, Austin H. Clark, Frederick V. Coville, William F. Foshag, Herbert Friedmann, Chester G. Gilbert, Charles W. Gilmore, Walter Hough, Leland O. Howard, Aleš Hrdlička, Neil M. Judd, Herbert W. Krieger, Frederick L. Lewton, Gerrit S. Miller, Jr., Carl W. Mitman, Charles E. Resser, Waldo L. Schmitt, Leonhard Stejneger, Ruel P. Tolman.
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Property clerk.—William A. Knowles.
Engineer.—Clayton R. Denmark.

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FREER GALLERY OF ART

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Associate curator.—Carl Whiting Bishop.
Assistant curator.—Grace Dunham Guest.
Associate.—Katharine Nash Rhoades.
Assistant.—Archibald G. Wenley.
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Archeologist.—Frank H. H. Roberts, Jr.
Associate Anthropologist.—Winslow M. Walker.
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Chief clerk.—Coates W. Shoemaker.

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Assistant director.—Ernest P. Walker.

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Director.—Charles G. Abbot.
Assistant director.—Loyal B. Aldrich.
Research assistant.—Frederick E. Fowle, Jr.
Associate research assistant.—William H. Hoover.

DIVISION OF RADIATION AND ORGANISMS

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Research associate.—Earl S. Johnston.
Associate research assistant.—E. D. McAlister.
Research assistant.—Leland B. Clark.

REGIONAL BUREAU FOR THE UNITED STATES, INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE

Assistant in charge.—Leonard C. Gunnell.

REPORT OF THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

C. G. ABBOT

FOR THE YEAR ENDING JUNE 30, 1932

To the Board of Regents of the Smithsonian Institution.

GENTLEMEN: I have the honor to submit herewith my report showing the activities and condition of the Smithsonian Institution and the Government bureaus under its administrative charge during the fiscal year ended June 30, 1932. The first 14 pages contain a summary account of the affairs of the Institution. Appendixes 1 to 11 give more detailed reports of the operations of the United States National Museum, the National Gallery of Art, the Freer Gallery of Art, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, the Division of Radiation and Organisms, the United States Regional Bureau of the International Catalogue of Scientific Literature, the Smithsonian library, and of the publications issued under the direction of the Institution.

THE SMITHSONIAN INSTITUTION

OUTSTANDING EVENTS OF THE YEAR

Preliminary plans have been completed for the wings authorized in 1930 to be added to the Natural History Building of the National Museum; appropriations have not yet been made, however, to begin construction. An unrestricted bequest of $100,000 was received for the endowment funds of the Institution from the late Dwight W. Morrow. Two $2,500 Research Corporation awards were made through the Institution to Doctors Douglass and Antevs. Two notable public lectures were given at the Institution, the first Arthur Lecture by Dr. Henry Norris Russell and the sixth Hamilton Lecture by Dr. Albert Charles Seward. Volume 12, the last volume of the Smithsonian Scientific Series, was sent to the printer near the close of the year. The fifth revised edition of the Smithsonian Meteorological Tables and the fourth reprint of the Smithsonian Mathematical Tables—Hyperbolic Functions—were issued. A con-

siderable number of scientific expeditions were in the field from the Institution, the National Museum, and the Bureau of American Ethnology; these expeditions brought back valuable new information and collections bearing on the Institution's researches. The Director of the National Zoological Park headed an expedition to British Guiana, returning with 317 live animals for the park. Volume V of the Annals of the Astrophysical Observatory appeared, presenting the results of its researches on the sun for the past 10 years. New instruments for the solar work were devised, and investigations were made of periodicities in solar and terrestrial phenomena. The Division of Radiation and Organisms, pursuing its pioneering experiments in biophysics, measured the carbon-dioxide assimilation of wheat for different light intensities, made experiments on the lethal effects of the ultra-violet rays upon algae, and a study of the effects of different wave-length distributions of light on the growth of plants. The reduction in the Institution's income, both private and governmental, has occasioned strict economy in all lines and the curtailment of some activities. Its funds for publication have been cut nearly to one-half of last year's amount, with the result that valuable manuscripts have had to be refused or held up for a year and others have been cut to half their normal size, as has been done, for instance, with this report.

THE ESTABLISHMENT

The Smithsonian Institution was created by act of Congress in 1846, according to the terms of the will of James Smithson, of England, who in 1826 bequeathed his property to the United States of America "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men." In receiving the property and accepting the trust, Congress determined that the Federal Government was without authority to administer the trust directly and, therefore, constituted an "establishment" whose statutory members are "the President, the Vice President, the Chief Justice, and the heads of the executive departments."

THE BOARD OF REGENTS

The affairs of the Institution are administered by a Board of Regents whose membership consists of "the Vice President, the Chief Justice, three Members of the Senate, and three Members of the House of Representatives, together with six other persons other than Members of Congress, two of whom shall be resident in the city

of Washington and the other four shall be inhabitants of some State, but no two of them of the same State." One of the Regents is elected chancellor of the board. In the past the selection has fallen upon the Vice President or the Chief Justice, and a suitable person is chosen by the Regents as Secretary of the Institution, who is also secretary of the Board of Regents, and the executive officer directly in charge of the Institution's activities.

A number of changes in the personnel of the board occurred during the year. The terms as Regents of three congressional members expired—Representatives R. Walton Moore, Robert Luce, and Albert Johnson. Six vacancies on the board were filled by the appointment or reappointment of three Members of Congress—Representatives Albert Johnson, T. Alan Goldsborough, and A. J. Montague—and three citizen Regents—R. Walton Moore, Virginia; Robert W. Bingham, Kentucky; and Augustus P. Loring, Massachusetts. A. J. Montague having resigned, E. H. Crump was appointed to succeed him.

The roll of Regents at the close of the year was as follows: Charles Evans Hughes, Chief Justice of the United States, chancellor; Charles Curtis, Vice President of the United States; Members from the Senate—Reed Smoot, Joseph T. Robinson, Claude A. Swanson; Members from the House of Representatives—Albert Johnson, T. Alan Goldsborough, E. H. Crump; citizen members—Frederic A. Delano, Washington, D. C.; Irwin B. Laughlin, Pennsylvania; John C. Merriam, Washington, D. C.; R. Walton Moore, Virginia; Robert W. Bingham, Kentucky; Augustus P. Loring, Massachusetts.

FINANCES

PRIVATE FUNDS

The permanent investments of the Institution consist of the following:

Total endowment for general or specific purposes (exclusive of Freer funds)	$1,775,804.36
Itemized as follows:	
Deposited in the Treasury of the United States, as provided by law	1,000,000.00
Deposited in the consolidated fund—	
Miscellaneous securities, etc., either purchased or acquired by gift; cost or value at date acquired	712,156.86
Springer, Frank, fund for researches, etc. (bonds)	13,835.00
Younger, Helen Walcott, fund (real-estate notes and stock held in trust)	49,812.50
Total	1,775,804.36

The above-mentioned funds of the Institution are described as follows:

Fund	United States Treasury	Consolidated fund	Separate funds	Total
Arthur, James, fund		$50,699.31		$50,699.31
Bacon, Virginia Purdy, fund		63,512.52		63,512.52
Baird, Lucy H., fund		9,959.05		9,959.05
Barstow, Frederic D., fund		964.27		964.27
Canfield Collection fund		48,488.51		48,488.51
Casey, Thomas L., fund		9,797.14		9,797.14
Chamberlain fund		35,698.68		35,698.68
Hodgkins (specific) fund	$100,000.00			100,000.00
Hughes, Bruce, fund		19,205.63		19,205.63
Myer, Catherine W., fund		22,907.94		22,907.94
Pell, Cornelia Livingston, fund		3,060.69		3,060.69
Poore, Lucy T. and George W., fund	26,670.00	36,172.17		62,842.17
Reid, Addison T., fund	11,000.00	14,478.94		25,478.94
Roebling Collection fund		152,987.77		152,987.77
Rollins, Miriam and William, fund		53,787.00		53,787.00
Smithsonian unrestricted funds:				
Avery fund	14,000.00	47,207.09		61,207.09
Endowment fund		81,374.67		81,374.67
Habel fund	500.00			500.00
Hachenberg fund		5,100.49		5,100.49
Hamilton fund	2,500.00	511.70		3,011.70
Henry fund		1,533.17		1,533.17
Hodgkins general fund	116,000.00	38,018.94		154,018.94
Parent fund	727,640.00	1,547.50		729,187.50
Rhees fund	590.00	599.63		1,189.63
Sanford fund	1,100.00	1,128.49		2,228.49
Springer fund			$13,835.00	13,835.00
Walcott, Charles D. and Mary Vaux, fund		12,450.72		12,450.72
Younger, Helen Walcott, fund			49,812.50	49,812.50
Zerbee, Frances Brinckle, fund		964.84		964.84
Total	1,000,000.00	712,156.86	63,647.50	1,775,804.36

Freer Gallery of Art.—The invested funds of the Freer bequest are classified as follows:

Court and grounds fund	$580,016.22
Court and grounds maintenance fund	145,171.79
Curator fund	589,763.31
Residuary legacy	3,858,208.44
Total	5,173,159.76

Recapitulation of endowment funds, June 30, 1932

Endowment for general purposes	$1,039,351.68
Endowment for specific purposes other than Freer endowment	736,452.68
Total endowment other than Freer endowment	1,775,804.36
Freer endowment	5,173,159.76

STATEMENT OF INCOME

PARENT INSTITUTION

Expendable income for fiscal year:	
Cash income from all sources for general work of the Institution	$74,883.41
Cash income from investments and other sources for specific objects	27,393.29
Cash gifts expendable for specific objects	33,761.71
Total	136,038.41

Increase of endowment:	
Endowment for general work of the Institution	$108,020.39
Endowment for specific uses	7,430.71
Total	115,451.10

FREER GALLERY OF ART

Expendable income for fiscal year: Cash income for general work of the gallery	281,476.85

The practice of depositing on time in local trust companies and banks such revenues as may be spared temporarily has been continued during the past year, and interest on these deposits has amounted to $5,364.02.

The Institution gratefully acknowledges gifts or bequests from the following:

Dr. W. L. Abbot, for archeological investigations in Cuba and the Bahama Islands.

Mrs. Laura Welsh Casey, further contributions to the Thomas Lincoln Casey fund for investigations in Coleoptera.

The estate of Dwight W. Morrow, for general endowment fund of the Institution.

Mr. Childs Frick, further contributions for researches in vertebrate paleontology.

Research Corporation, for further contributions for researches in radiation.

Rockefeller Foundation, for further contributions for researches in radiation.

Mr. John A. Roebling, for further contributions for researches in radiation.

The estate of William H. Rollins, for investigations in physics and chemistry.

Mrs. Mary Vaux Walcott, for archeological investigations in Alaska.

From an anonymous friend, for further investigations in Old World archeology.

PUBLIC FUNDS

The following appropriations were made by Congress for the Government bureaus under the administrative charge of the Smithsonian Institution for the fiscal year 1932:

Salaries and expenses		$38,644.00
Gellatly art collection		20,000.00
International Exchanges		54,060.00
American Ethnology		72,640.00
International Catalogue of Scientific Literature		8,150.00
Astrophysical Observatory		37,620.00
National Museum:		
Maintenance and operation [1]	$154,580.00	
Preservation of collections [2]	620,510.00	
		775,090.00

[1] Former appropriations "Furniture and fixtures," "Heating and lighting," and "Building repairs" provided for under this appropriation.

[2] Former appropriations "Books" and "Postage" merged with "Preservation of collections" and provided for under this appropriation.

National Gallery of Art	$45,220.00
National Zoological Park	255,540.00
National Zoological Park, plans for building for small mammals	4,500.00
Printing and binding	104,000.00
Total	1,415,464.00

MATTERS OF GENERAL INTEREST

DWIGHT W. MORROW BEQUEST

Under the terms of the will of Dwight W. Morrow, former ambassador to Mexico and later United States Senator from New Jersey, who died October 5, 1931, the Institution received a bequest of $100,000. The legacy reads as follows:

> To the Smithsonian Institution, city of Washington, District of Columbia, one hundred thousand dollars ($100,000), to be part of its endowment funds.

Mr. Morrow, who for several years was a member of the Board of Regents of the Smithsonian Institution, had taken an active interest in its affairs. His generous bequest is a substantial indication of that interest; it will be particularly valuable to the Institution because it is unhampered by conditions in the application of its income, making it possible to assign the additional funds thus provided to the researches most in need of assistance.

RESEARCH CORPORATION AWARDS TO DOCTORS DOUGLASS AND ANTEVS

In recognition of their outstanding scientific researches the fourth and fifth Research Corporation awards of $2,500 each were made through the Smithsonian Institution to Dr. Andrew Ellicott Douglass and Dr. Ernst Antevs on December 18, 1931. The presentation was made in the auditorium of the National Museum, the exercises opening with an account of the Research Corporation and its awards by the Secretary of the Institution, and informally by Mr. Elon Hooker, a director of the corporation. This was followed by the formal presentation by Chief Justice Charles Evans Hughes, chancellor of the Institution, and the recipients then delivered addresses on their researches. An account of the ceremony, together with the full text of the addresses of Doctors Douglass and Antevs, will be found in the general appendix to the Smithsonian Report for 1931.

LECTURES

Arthur Lecture.—The first lecture under the bequest of James Arthur, received by the Institution in 1931, was given by Dr. Henry Norris Russell, professor of astronomy at Princeton University, who lectured on The Composition of the Sun, in the auditorium of the National Museum on the evening of January 27, 1932.

Hamilton Lecture.—The sixth Hamilton Lecture was given on the evening of March 30, 1932, also in the auditorium of the Museum, by Dr. Albert Charles Seward, master of Downing College and professor of botany, Cambridge University. Doctor Seward's subject was Plant Records of the Rocks.

These two lectures are being published by the Institution, Doctor Russell's in the Smithsonian Report for 1931 and Doctor Seward's in the Report for 1932.

SMITHSONIAN SCIENTIFIC SERIES

The Smithsonian Scientific Series is a set of 12 volumes, written in popular style and profusely illustrated, on the various branches of science included in the scope of the Institution's work. The books were written by members of the staff and collaborators of the Institution, and they are published and sold by a New York corporation, the Smithsonian Institution Series, Inc. The Institution receives a definite royalty on all sales. Three-fourths of all receipts are added to the permanent endowment, the remainder used as income to promote the Smithsonian program of research and publication.

Eleven volumes of the series have thus far been issued and the twelfth and last was in press at the close of the fiscal year. The titles and authors are as follows:

1. The Smithsonian Institution, by Webster Prentiss True.
2. The Sun and the Welfare of Man, by Charles Greeley Abbot.
3. Minerals from Earth and Sky. Part I, The Story of Meteorites, by George P. Merrill; Part II, Gems and Gem Minerals, by William F. Foshag.
4. The North American Indians. An account of the American Indians north of Mexico, compiled from the original sources, by Rose A. Palmer.
5. Insects: Their Ways and Means of Living, by R. E. Snodgrass.
6. Wild Animals in and out of the Zoo, by William M. Mann.
7. Man from the Farthest Past, by C. W. Bishop, C. G. Abbot, and A. Hrdlička.
8. Cold-Bloodod Vertebrates, by C. W. Gilmore, D. M. Cochran, and S. F. Hildebrand.
9. Warm-Blooded Vertebrates. Part I, Birds, by Alexander Wetmore; Part II, Mammals, by Gerrit S. Miller, jr., and James W. Gidley.
10. Shelled Invertebrates of the Past and Present, with Chapters on Geological History, by Ray S. Bassler, Charles E. Resser, Waldo L. Schmitt, and Paul Bartsch.
11. Old and New Plant Lore, by Agnes Chase, A. S. Hitchcock, Earl S. Johnston, J. H. Kempton, Ellsworth P. Killip, Daniel T. MacDougal, Albert Mann, and William R. Maxon.
12. Great Inventions, by Charles Greeley Abbot.

COOPERATIVE ETHNOLOGICAL AND ARCHEOLOGICAL INVESTIGATIONS

In 1928 Congress appropriated $20,000 for cooperative ethnological and archeological investigations in this country, the allotments to be made on approval of the Secretary of the Institution in amounts

equal to those raised by the organizations proposing the investigations. The fund was nearly exhausted in 1931, but it was possible to make two small allotments this year, bringing to a close this cooperative project.

Allotments from the fund for cooperative ethnological and archeological investigations during the year ended June 30, 1932

1932

May 12. University of Denver, to excavate two dry caves in southern Colorado, one near La Veta and the other in the Apishapa Valley district; and if time and money permit, to make a reconnaissance of archeological remains in and around the San Dunes National Monument, $300.

June 23. Mississippi, Department of Archives and History, to conduct a survey of Choctaw and Chickasaw Indian village sites and excavate promising mounds in Mississippi, $259.

EXPLORATIONS AND FIELD WORK

The Institution and its branches sent out or participated in 25 expeditions in the furtherance of its researches in anthropology, biology, geology, and astrophysics. These expeditions visited 13 States of the United States, several countries of Europe, Canada, Alaska, Mexico, Hispaniola, Jamaica, British Guiana, and Southwest Africa. As illustrative of the aims of these expeditions, I may mention Dr. W. F. Foshag's trip to various mining localities in Mexico for the purpose of collecting certain rare minerals and series of specimens illustrating occurrences and ore formation for the National Museum; Dr. Alexander Wetmore's expedition to Hispaniola to obtain needed information on the bird life of that region; and a continuation of Dr. Aleš Hrdlička's anthropological work in Alaska, in the course of which he obtained anthropometric measurements on the living natives and, through excavation, collections of old skeletal and archeological material. The results of these and of the other expeditions of the year are described and illustrated in Explorations and Field Work of the Smithsonian Institution in 1931, Smithsonian publication No. 3134.

PUBLICATIONS

The consolidation of the three separate editorial offices of the Institution into one central office under the general direction of the editor of the Smithsonian, announced in last year's report, has proved to be a very satisfactory arrangement. The most important results have been more accuracy and a greater uniformity of style in the several series issued under the Institution and a shortening of the average time from manuscript to finished book; furthermore, a central contact point is provided between the printer and the edi-

torial staff, and all of the financial and other records are kept in one office, where the status of every publication and allotment is available at any time. One hundred and twenty-one volumes and pamphlets were issued during the year, 50 by the Institution proper, 63 by the National Museum, 7 by the Bureau of American Ethnology, and 1 by the Astrophysical Observatory. Detailed information regarding these publications will be found in the report of the editor, Appendix 11. The total number of publications distributed was 204,240.

LIBRARY

The Smithsonian library, made up of 10 divisional libraries and 35 sectional libraries, now contains more than 800,000 volumes, pamphlets, and charts. Accessions during the year totaled 6,807 volumes and 4,648 pamphlets and charts, most of which were received in exchange. Among the outstanding gifts were a set in 45 volumes of the "Phra Tripitaka" from His Majesty the King of Siam and a copy of "Cristoforo Colombo—Documenti & prove della sua appartenenza a Genova," presented by His Excellency Dino Grandi. Considerable progress was made in recataloguing the botanical collection of the National Museum library, and the reclassifying and recataloguing of the Freer Gallery of Art library was almost completed. Arrangements were made for assembling a dictionary index to all of the publications of the Institution and its branches.

GOVERNMENTALLY SUPPORTED BRANCHES[1]

National Museum.—The total appropriations for the past year were $835,090, an increase of $4,696 over those for the previous year. Plans were completed for the wings to be added to the Natural History Building, authorized in 1930; but owing to the need for national economy, the estimate of $1,200,000 to begin construction could not be included in the Budget. Additions to the collections numbered 157,870 specimens, and as usual a large number of specimens were examined and reported upon, exchanged with other institutions, and given to schools. Important accessions in anthropology included collections of artifacts from prehistoric sites in Europe; series of old native implements from Kodiak Island, Alaska; costumes and implements used by the natives of Panama; and native pottery and textiles from Africa. Collections of general biological material were received from Southwest Africa and from Siam. Important series of plants came from the Brazilian-Venezuelan frontier and from

[1] For further details regarding the work of these branches, see the appendixes at the end of this report.

Peru. In geology, a large number of interesting minerals were accessioned, including a gold nugget weighing 81 ounces troy; also important collections of fossils, particularly of mammals. The outstanding addition in history was a series of 71 paintings illustrating events in American history, by the late J. L. Gerome Ferris, presented by Mrs. Ferris. Twenty-three scientific expeditions relating to the Museum were in the field during the year, bringing back valuable material for study and exhibition. The number of visitors for the year totaled 1,630,030.

National Gallery of Art.—Two special exhibitions were held during the year—one a collection of paintings made in Spain by Wells M. Sawyer and the other an exhibition in honor of the bicentennial of the birth of George Washington, which consisted of paintings, sculpture, plans of Washington City, etc., and was held under the auspices of the United States Bicentennial Commission and the National Commission of Fine Arts. Accessions of art works included a number of portraits, including those of Henry Ward Ranger and Rear Admiral Richard Evelyn Byrd, and two water-color paintings by William Spencer Bagdatopoulos. Fifteen paintings were purchased by the Council of the National Academy of Design; under Mr. Ranger's will, any of these may be claimed by the National Gallery during the 5-year period beginning 10 years after the artist's death and ending 15 years after his death.

Freer Gallery of Art.[1]—Additions to the collections include examples of Persian bookbinding; Chinese bronze; Chinese and Persian ceramics; Chinese jade; Arabian, Persian, Armenian, and Indian manuscripts; and Chinese silver-gilt. Curatorial work has been devoted to a study of a Japanese *mandara* painting; to a study of the Indian manuscript, *Vasanta Vilāsa;* to a critical study of an ancient Armenian manuscript of the Four Gospels; and to the study of inscriptions on Buddhist stone sculptures and of inscriptions and seals on Chinese paintings. The total attendance of visitors for the year was 122,940. A full report of archeological work undertaken by the field staff of the gallery in Shansi Province, China, is now being published in Shanghai. It will be printed in both English and Chinese and will be fully illustrated.

Bureau of American Ethnology.—Much of the work of the bureau depends upon field expeditions, which obtain needed information and collections connected with its investigations of the Indians. The chief, Mr. Stirling, as a guest of the privately organized Latin American expedition, visited the Tule Indians of Panama and the Jivaros of Ecuador. Doctor Swanton had considerable success in

[1] The Government's expense in connection with the Freer Gallery of Art consists mainly in the care of the building and certain other custodial matters. Other expenses are paid from the Freer endowment funds.

locating the probable route of De Soto and Moscoso through Arkansas and Louisiana. He also recorded linguistic material among the Tunica Indians in Louisiana and continued the preparation of the handbook of the Southeastern Indians. Doctor Michelson conducted linguistic and other researches among the Cheyenne, the Fox, and the Kiowa. Mr. Harrington studied the Indians of Monterey and San Benito Counties, Calif., and investigated the Chingichngich culture of the coast of southern California. Doctor Roberts continued excavations near Allantown, Ariz., uncovering a number of pit houses, one of which, dated 797 A. D. by means of charred timbers, proved to be one of the earliest buildings of known date in the Southwest. Doctor Strong conducted excavations in the stratified deposits on the top of Signal Butte, in western Nebraska, revealing three distinct levels of occupation, the lowest evidently of great antiquity. Mr. Hewitt continued his researches on the Iroquois Indians of the United States and Canada. Mr. Walker explored certain caves in the Ozark region of north central Arkansas and mound and village sites in northern Louisiana. Miss Densmore continued her researches on Indian music, particularly among the Winnebago of Wisconsin and the Seminole of Florida.

International Exchanges.—The International Exchange Service is the official United States agency for the exchange with other countries of parliamentary documents, departmental documents, and miscellaneous scientific and literary publications. The total number of packages of such material handled by the service during the year was 759,035, an increase of about 18 per cent over last year's total. The total number of sets of United States official documents forwarded to foreign depositories is 112, and the number of copies of the Congressional Record sent to designated agencies abroad is 104.

National Zoological Park.—An expedition to British Guiana, led by the director of the park, brought back 317 live animals, including 13 species of mammals, 25 of birds, and 31 of reptiles and amphibians. Other accessions for the year totaled 900 animals. There were removed by death, exchange, and return of animals on deposit a total of 1,416, leaving the collection at the close of the year at 2,302 animals. Outstanding among the gifts of the year were the baby mountain gorilla and chimpanzee brought by Mr. and Mrs. Martin Johnson. Visitors totaled 2,169,460, including 716 groups from schools and other organizations in 22 States, the District of Columbia, and Cuba. Work has progressed on the plans for a building for small mammals and great apes. The newly completed reptile house continues to be the most popular building at the park, demonstrating that it is well worth while to exhibit animals in suitable and attractive quarters.

Astrophysical Observatory.—Volume V of the annals of the observatory was published during the year. This volume covers the work of the period 1920 to 1930, including descriptions of the stations and instruments, discussions of sources of error, methods of observation, tables of daily observations, 10-day and monthly means, and a discussion of the results of the several observing stations during the 10-year period. New instruments were designed and constructed for solar researches, those completed being a new 2-chamber water-flow pyrheliometer, a doubly dispersing spectroscope designed to observe the extreme infra-red solar spectrum between wave lengths 10 and 30 microns, and the periodometer, an instrument for investigation of periodicities in solar and terrestrial phenomena. Daily observations of the solar constant of radiation were continued at Montezuma, Chile, and Table Mountain, Calif. The station at Mount Brukkaros was closed. A volcanic eruption in Chile during the year made the atmosphere at Montezuma so hazy that satisfactory measurements of the solar constant could not be made there after April, 1932. In the search for a desirable observatory site in Africa, A. F. Moore found Mount Saint Katherine in the Sinai Peninsula in Egypt to be the most promising of those investigated.

Division of Radiation and Organisms.[2]—The carbon dioxide assimilated by wheat has been measured for light intensities varying from 78 to 1,900 foot-candles and for carbon dioxide concentrations varying from 0.004 to 0.500 per cent. A set of individual plant-growth chambers has been completed, permitting comparative observations on the effects of different wave-length distributions of light; a first experiment indicates that an excessive intensity in the less refrangible end of the spectrum, that is, the infra-red and extreme red, is accountable for much of the abnormal appearance of plants grown in artificial light. An interesting set of experiments has been conducted on the lethal effects of the ultra-violet rays upon unicellular algae. Phototropic investigations have been carried further into the blue end of the spectrum. Ultra-violet measurements of the mercury arc with the double monochromator have been carried to the point where absolute intensities can be determined with reasonable certainty. Cooperative work with the Department of Agriculture includes a study of the effects of light upon noncompetitive crop plants.

International Catalogue of Scientific Literature.—In addition to the routine work of the bureau, letters were sent by the Secretary of the Institution to all of the former regional bureaus asking whether they would again cooperate in the publication of the catalogue by supplying references to the scientific literature of their

[2] The Division of Radiation and Organisms is supported almost wholly by annual grants from private sources.

regions if funds could be provided to reestablish and finance the central publishing bureau. The replies so far received have been most gratifying, 16 out of 18 agreeing to cooperate in the resumption of the enterprise. It is hoped and expected that the necessary capital to resume publication, estimated at $75,000, can be obtained.

NECROLOGY

DAVID STARR JORDAN

David Starr Jordan, chancellor emeritus of Stanford University, and associate in zoology, United States National Museum, since 1921, was born January 19, 1851, and died at his home in Menlo Park, Palo Alto, Calif., on September 19, 1931. Doctor Jordan became interested in ichthyology in the early seventies and devoted much of his time to the collection and study of fishes, to the great benefit of the collections of the National Museum. With his close associates—Copeland, Gilbert, Evermann, and others—and in cooperation with the United States Bureau of Fisheries, Doctor Jordan collected not only in the United States generally but also from Mexico to Panama and in Hawaii, Japan, and elsewhere, making full reports upon material collected, much of which was deposited in the division of fishes of the National Museum.

Over a period of 45 years (1878–1923) Doctor Jordan was author of 57 ichthyological papers, and coauthor of nearly 200 others, published in the Proceedings of the United States National Museum. In addition he was author of two bulletins of the National Museum and coauthor of three, including the monumental work on The Fishes of North and Middle America, in four volumes, written in collaboration with Dr. Barton Warren Evermann.

JAMES WILLIAMS GIDLEY

James Williams Gidley, assistant curator of fossil mammals in the United States National Museum, was born January 7, 1866, and died in Washington on September 26, 1931. Doctor Gidley's life work was centered in the science of vertebrate paleontology, specializing in the fossil mammalia, in which he attained great distinction. Many scientific papers, largely published by the National Museum, record the results of his investigations. He was particularly noted for his research on the fossil horses of North America and for his studies on fossil remains in the Pleistocene of Florida. Through his wide knowledge of comparative anatomy he was called into frequent consultation by students of modern mammals. Doctor Gidley entered the Government service in 1905 as a member of the scientific staff of the National Museum and had been associated with the paleontological work of the Smithsonian Institution steadily since that time.

CHARLES WALLACE RICHMOND

Charles Wallace Richmond, associate curator of birds, United States National Museum, was born in Kenosha, Wis., December 31, 1868, and died in Washington May 19, 1932. He came to Washington in 1881 and in 1888 joined the Geological Survey in its explorations in Montana. Returning from this, he became ornithological clerk in the division of economic ornithology and mammalogy in the United States Department of Agriculture. In 1892–93 he was in Nicaragua making natural-history collections, and in 1894 he was appointed assistant curator of birds in the National Museum, and in 1918 associate curator, which position he held until his death. In 1900 he was a member of the United States National Museum expedition to Puerto Rico. During the 38 years that he was affiliated with the Museum he has been a steady contributor to the publications of the Smithsonian Institution dealing with problems of ornithology and nomenclature. In these fields he was a recognized authority.

Respectfully submitted.

C. G. Abbot, *Secretary.*

APPENDIX 1

REPORT ON THE UNITED STATES NATIONAL MUSEUM

SIR: I have the honor to submit the following report on the condition and operations of the United States National Museum for the fiscal year ended June 30, 1932:

The total appropriations for the maintenance of the National Museum for this period amounted to $835,090, an increase of $4,696 over those for 1931. In this year's appropriations the six separate items formerly used were combined under two headings, "Preservation of collections" and "Maintenance and operation."

The appropriations for building repairs for 1931 included four items that were for noncontinuing appropriations, amounting to $37,500, omitted in the appropriation for 1932. Additions under maintenance and operation for 1932 amount to $8,280, so that, omitting the items coming to $37,500 indicated above, there is a decrease under this heading of $29,220.

The amount available under preservation of collections was increased by $20,416, of which $18,600 was applied to additional personnel. Reallocations made by the Classification Board added $2,160 to the salary rolls. Other increases amounted to $1,816.

The sum available for printing and binding was increased by $3,500 to care for an arrearage in the printing of manuscripts, for which further additional funds are much needed.

Requirements for additional appropriations for the National Museum follow lines indicated in previous reports. Further personnel is a question of paramount importance, as the present staff is fully occupied in the various duties that come under its scope, and there is constant need for additional assistance, as many important tasks now have to be postponed, this postponement sometimes running for several years.

This situation will be aggravated during the coming year, as under the Economy Act all funds accumulated as a result of lapses in regular positions are impounded for return to the Treasury. Moneys accumulated from such lapses have been the principal means of hiring temporary employees, so that little of the usual temporary help will be available during 1933. This means that numerous tasks will be at a complete standstill and that the arrearage at the close of the year will be considerable.

Further, the appropriations for the National Museum above the salary rolls have not been sufficient for the regular routine expendi-

tures, these sums having been supplemented by accumulations from lapses due to temporary vacancies in regular positions on the salary roll. Under the Economy Act, as stated above, these funds are all impounded for return to the Treasury, so that the Museum in 1933, in addition to its situation with regard to temporary help, will find itself more than $10,000 short of the funds necessary for regular routine expenditures.

Curtailment in appropriation for printing and binding for the fiscal year 1933 has placed the National Museum in a situation where the usual publications can not be issued. This will result in the postponement of many valuable papers whose contents should be made available for general public use.

ADDITIONS TO THE NATURAL HISTORY BUILDING

In the report for last year there was mention of the provision in the second deficiency bill for 1931 of an appropriation of $10,000 for the preparation of preliminary plans for additions to the Natural History Building. It will be recalled that the extension of the Natural History Building, through wings on the east and west ends, at a cost of $6,500,000, was authorized in the Smoot-Elliott bill, approved by the President on June 19, 1930. The executive committee of the Board of Regents selected the Allied Architects (Inc.) of Washington to make the necessary plans. The work has progressed rapidly and efficiently under the direction of Nathan Wyeth, so that these plans are now in hand.

An estimate for $1,200,000 for a first appropriation to begin construction was included in the items submitted to the Bureau of the Budget for the fiscal year 1933, it being considered that this would suffice for excavation, foundations, and similar items, with the expectation that contracts would be made covering the continuance of the work. Due to the financial situation which arose and the necessary restriction that this imposed on the National Budget, it was not practicable to include this item in the estimates finally submitted to the Congress, nor was there later opportunity to consider it favorably. The matter has rested at this point pending more favorable opportunity.

It is highly important that construction should be begun as soon as financial conditions will permit. The addition in space that these new wings will bring is seriously needed, since the present Museum buildings are so badly crowded as to interfere with logical exhibition and storage collections, and there can be no expansion. The matter is particularly important in view of the many excellent specimens that are constantly offered that form highly desirable additions to the national collections. Many expedients are adopted to provide additional storage facilities, but we are about at the end

of our resources in this respect. It must be anticipated that more than two years will be required before the new area is ready for occupancy after construction is begun, so that work on the wings should commence as soon as practicable.

Final completion of the additions to the Natural History Building will provide properly for the Museum's needs in one direction, but other collections require more adequate housing than can be given them with the existing structures. The great collections in engineering, aviation, textiles, history, and associated fields are at present in the old Museum Building, constructed in 1881 at a cost of $225,000, and in a temporary building south of the Smithsonian Building that houses most of the aircraft. Both buildings are crowded to such an extent that many desirable objects offered for the national collections can not be accepted because there is no room for them. Plans should be drawn as soon as possible for a large building to house the collections concerned with arts and industries, including aircraft, that will provide proper facilities for these important collections. There should be, further, a separate building for the great historical collections, in which there are found such objects as relics of Washington, Lincoln, and many other illustrious Americans; the original Star-Spangled Banner; the great series of costumes, particularly those of the wives of the Presidents; and many other objects of pride to our Nation, which should be displayed in proper form for the thousands of visitors who come annually to Washington.

COLLECTIONS

Additions to the collections of the National Museum during the fiscal year amounted to 157,870 individual specimens, a number considerably less than that of the last few years but one that must be considered normal, since in previous accounts there had been included large private collections coming as gifts or extended series of specimens from prolonged explorations in the field. Materials of various kinds received for examination and report amounted to 12,060 lots. Gifts of duplicate materials to schools and other educational organizations included 6,299 specimens, while exchanges of duplicate materials with other institutions and with individuals amounted to 11,621 specimens, for which there were received in return material needed for our collections. Loans to scientific workers outside of Washington totaled 36,639 specimens.

Following is a digest of the more important accessions for the year in the various departments and divisions of the Museum:

Anthropology.—A plaster cast of the famous bison carved in clay by Upper Paleolithic sculptors from the cave of Tuc d'Audoubert, Ariège, France, was obtained through arrangements made by J. Townsend Russell, and purchased and presented by the Old World

archeology fund administered by the Smithsonian Institution. There came also a valuable collection of stone artifacts of Aurignacian age from three localities in the French Pyrenees collected by Mr. Russell as field director, under the Smithsonian Institution, of the Franco-American Union for Prehistoric Research in France. There were further collections of artifacts from several prehistoric sites in Europe and North Africa presented by Mr. Russell from his own collections. In Alaska Dr. Aleš Hrdlička collected on Kodiak Island a series of stone, bone, and wooden implements of a type not previously known, and from the region about Bristol Bay and from Kodiak Island an important series of human skeletons. M. W. Stirling forwarded a large collection of costumes and implements from the Indians of Panama, with additional materials from northwestern South Africa. From Nigeria and the Gold Coast of Africa, C. C. Roberts sent further collections of native materials, including pottery, textiles, brass castings, and many other objects. Through Mrs. Charles D. Walcott there were obtained from Hawaii several ancient poi bowls cut from wood, which are new to the Museum's collections.

Biology.—An interesting collection of birds, mammals, reptiles, and plants was obtained by Mrs. L. O. Sordahl while at the solar observatory of the Smithsonian Institution on Mount Brukkaros in Southwest Africa. This arid region is one that has been little visited by naturalists and one from which the National Museum has had little material previously. Dr. Hugh M. Smith, fisheries adviser to the Government of Siam, forwarded further collections of birds, mammals, reptiles, fish, and mollusks, so that the series from Siam is of steadily growing importance. W. G. Sheldon and Richard Borden presented an important collection of mammals made in British Columbia from regions which have not previously been represented in the Museum. These gentlemen are continuing work in that area during the coming year, and further material may be expected. The division of birds obtained 23 genera and 340 forms new to its collections, a considerable number coming from Africa through funds supplied by the late Marcus Daly. A huge specimen of the ocean sunfish estimated to weigh about 1,200 pounds, captured in nets of the Bayhead Fisheries (Inc.), off the coast of New Jersey, was presented through the Edward C. Worden Laboratory of Millburn, N. J. Additions to the collections of plants have included important series from South America collected by E. G. Holt along the Brazilian-Venezuelan frontier, presented by the National Geographic Society, and further collections from eastern Peru received as a gift from G. Klug, of Iquitos, Peru.

Geology.—Through the income of the Roebling fund of the Smithsonian Institution there were secured a number of valuable accessions, among them a nugget of gold weighing 81 ounces troy from

Plumas County, Calif.; an example of leaf gold; specimens of rare uranium minerals; and two flawless crystals of aquamarine. To the Canfield Collection there were added large exhibition slabs of crystal dolomite, on which there are crystals of other interesting minerals, and a large mass of smithsonite from New Mexico. Under the Chamberlain fund there have been obtained a number of interesting specimens of coral, illustrating its use as gem material. Additions to the Isaac Lea collection include a carved vase of Siberian malachite, and some fine opals from Mexico.

Through field investigations financed by the Smithsonian Institution there were obtained important collections of fossils, particularly of mammals. Mr. Gilmore collected a considerable part of a large creodont, three partial skeletons of *Coryphodon*, fossil turtles, several skulls of a primitive alligator (*Allognathosuchus*) and some remains of the giant flightless bird *Diatryma*. N. H. Boss collected a series of fossil horse bones from the quarry near Hagerman, Idaho, that included 32 skulls and 4 partly articulated skeletons, adding measurably to our series of the Pliocene horse *Plesippus shoshonensis*. The United States Geological Survey transferred several sets of rocks and ores and valuable collections of fossil plants. The fourth shipment of the private collection of Dr. A. Foerste, numbering about 10,000 specimens, came during the year as a gift. Through the Springer fund there were obtained some excellently preserved echinoids from the Cretaceous deposits of Texas, and several slabs of slate from the Devonian of Germany carrying fine specimens of crinoids preserved in pyrite.

Arts and Industries.—In the Division of Engineering a full-size model of a soft-coal mine was under construction, for which several companies contributed materials such as safety lamps, miners' belts, mine cars, and mine timbers, that will make a most attractive exhibit when assembled. The section of aeronautics received from the Autogiro Co. of America the first autogiro to fly in this country—an invention of Juan de la Cierva. This interesting machine was flown to Washington by James Ray, vice president of the Autogiro Co. of America, and was landed in a narrow space on the lawn in front of the Arts and Industries Building, where it was formally presented for the Museum. The Packard Motor Car Co. presented to the National Aircraft Collection the original Packard-Diesel aircraft engine. For the collection illustrating the development of land transportation there was received an electric brougham of about the year 1900, a gift from Mrs. Herbert Wadsworth.

For the collection showing the development of time keeping the city of Frederick, Md., presented a tower-clock movement made about 1791 that was continuously in use as the town clock until a few years ago.

From Mrs. Daniel Gardner the Division of Textiles received a notable series of specimens illustrating the textile art and related subjects of the early nineteenth century. These included hand-woven blankets, bed linens made from hand-spun yarns, Paisley and India shawls, coverlets, and baskets. Through exchange with Yale University, School of Forestry, the wood collections received a set of 116 Liberian woods collected where extensive forests were being cleared for rubber planting.

History.—The division of history obtained as its outstanding addition a series of 71 paintings by the late J. L. Gerome Ferris, presented by Mrs. Ferris, the set representing the life work of this well-known American artist. The pictures illustrate notable events in American history from the time of the discovery to the World War; a number deal with the career of George Washington. The personnel of the Eighty-first Division, A. E. F., presented a portrait of Maj. Gen. Charles J. Bailey, painted by Joseph Cummings Chase. The Chase Collection of A. E. F. portraits in the National Museum now includes 48 paintings. For the antiquarian collections Mrs. Eleanore Daughaday Hertle, through her husband, Louis Hertle, gave a topaz necklace presented to Mrs. James Monroe by her husband, James Monroe, when he was United States minister to France.

Through the Joint Committee on the Library the Congress of the United States loaned to the National Museum the Washington memorial window, a stained-glass panel by Maria Herndl representing George Washington on horseback conferring with Lafayette and Von Steuben. A large collection of chinaware, glassware, silverware, and other household objects of the early part of the nineteenth century was presented by Mrs. Daniel Gardner.

The collection of military uniforms of the World War period was augmented by a series of military uniforms and equipment of the type used by the enlisted men of the Portuguese Army contributed by the Government of Portugal through its minister in Washington.

The American Numismatic Society continued its additions to its large and interesting loan collection of coins. The philatelic collection received more than 4,000 specimens by transfer from the United States Post Office Department—chiefly sets of new issues distributed by the International Bureau of the Universal Postal Union.

MEETINGS AND RECEPTIONS

The lecture rooms and auditorium were used during the past year for 118 meetings, covering the usual wide range of activities. Full report on these will be found in the report of the United States National Museum, separately published.

CHANGES IN EXHIBITIONS

Following renovation of the Aircraft Building as a safeguard against fire, the collections in aeronautics were rearranged and the building was opened once more to the public. In the Arts and Industries Building a new case was constructed for the Star-Spangled Banner, the case being one of the largest in the Museum, displaying the entire design of this important flag. The new installation has proved most attractive, making this historic emblem one of the dominating features of the north hall, where it shows to great advantage. The naval collection shown formerly in the rotunda of the Natural History Building was transferred in the late winter and early spring to the northwest court of the Arts and Industries Building, this move bringing all of the historical collections together.

As another major feature in connection with the historical series, the Ferris collection of paintings was installed in specially built alcoves along the south side of the costumes hall. Here they make a most attractive display with specially arranged lighting. The paintings have been placed behind glass for protection.

The historical relics concerning George Washington were all assembled in the north hall, where they are shown more conveniently and attractively for visitors during the Bicentennial celebration. For the period of the Bicentennial a special exhibition, principally of statuary, was installed in the National Gallery of Art, with extension into the rotunda of the Natural History Building. The greater part of the foyer was allotted also for a temporary exhibit of the National Capital Park and Planning Commission dealing with the development of the city of Washington.

EXPLORATIONS AND FIELD WORK

Investigations in the field have included researches concerned with man, with fossil creatures of many kinds, and with various phases of living animal and plant life. The work has been carried on mainly through grants from the Smithsonian Institution, assisted by contributions from individuals, while certain projects were financed through the income of special funds under jurisdiction of the Smithsonian. A brief account of field work for the present year follows.

Through the financial assistance of Dr. W. L. Abbott, long a friend of the Smithsonian Institution, Herbert W. Krieger, curator of ethnology, carried on archeological investigations in Cuba in continuation of work of a similar nature that he has pursued for several years in Haiti and the Dominican Republic. His investigations covered a variety of sites between Camaguey and the extreme western end of

the island, with additional studies on the Isle of Pines. The collections from these investigations have been considerable; they indicate important evidence in the correlation and distribution of the prehistoric human cultures of the West Indian area.

Mr. Krieger was also occupied at various times in exploring Indian village sites in the lower Potomac area not far from Washington. In the course of this work he has prepared a map showing the location of known sites and has attempted to correlate data recovered with descriptions of such sites in the works of Captain John Smith and others. The work, when completed, will result in important information, as except for the writings of Smith and Raleigh we have practically nothing in the nature of a historical description of the Indians of tidewater Virginia and of the Carolinas.

Archeological work in northern Alaska was carried on during the summer by James A. Ford and Moreau B. Chambers under the general direction of H. B. Collins, jr., who has been working in this area for several years. Mr. Chambers excavated for three months at Gambell, St. Lawrence Island, where during the summer of 1930 Mr. Collins had found an unbroken sequence of Eskimo occupation extending from an early phase of the old Bering Sea culture to the present time. Mr. Chambers's work added to the completeness of this chronological record, bringing especially further evidence of the transitional phase between the old Bering Sea and the Punuk periods.

Mr. Ford proceeded to Point Barrow, but ice conditions in the Arctic were the worst in many years, so that he did not arrive until late in August, when the ground was beginning to freeze. Arrangements were therefore made for him to stay at Barrow over the winter in order to get in a full season of excavation in 1932. During the winter he was occupied in various studies pertaining to the modern Eskimo.

Neil M. Judd, curator of archeology, was engaged in an archeological reconnaissance on the San Carlos Indian Reservation, Ariz., on behalf of the Bureau of American Ethnology. Several caves near Arsenic Spring, on the southwest slopes of the Nantac Plateau, sheltered small pueblo ruins whose associated pottery fragments suggest occupancy in the thirteenth century or later.

F. M. Setzler, assistant curator of archeology, continued work in the Big Bend region of southern Texas, an area heretofore unknown archeologically that is thought to conceal important information relative to prehistoric contacts between the tribes of northeastern Mexico and those of the lower Mississippi Valley. Materially aided by the staff of the Plant Quarantine and Control Administration, United States Department of Agriculture, at Alpine, Mr. Setzler centered his recent explorations in the Chisos Mountains district, overlooking the Rio Grande. A number of important caves in this

region were investigated and various other examinations were made that correlate with results obtained last year in Presidio County to the west.

During the past year the cooperative agreement between the Smithsonian Institution and the University of Toulouse for the excavation of prehistoric sites in France, arranged by J. Townsend Russell, collaborator in Old World archeology, as representative of the Smithsonian Institution, became formally effective. In July, 1931, as field director of the Smithsonian Institution-University of Toulouse researches in prehistory, financed by the Institution from the Old World archeology fund, Mr. Russell initiated excavations in the cave of Marsoulas, in the commune of the same name, Department of Haute-Garonne, southern France. Count Henri Begouen, professor of prehistory at the University of Toulouse, participated in the investigations as representative of the university. Exploratory soundings were also made in the near-by cave of Tarte, in the cave of Roquecourbere, one of the two sites of Solutrean age in the Pyrenees, and in the workshop of Roquecourbere. In consequence of this preliminary work a formal agreement was signed on November 27 for cooperative work between the University of Toulouse and the Smithsonian Institution in the same general region during a period of 10 years.

It is a privilege to be able thus to join with the University of Toulouse in researches which should contribute new information to our present knowledge of Paleolithic man. While the cooperative agreement provides that the rarest objects remain in France, the generosity of the University of Toulouse is apparent from the fact that it retained only two of the specimens found during the preliminary work of the season of 1931. Thus it is to be expected that respresentative series of artifacts will come to help fill the very considerable gaps in the National Museum's limited exhibits of European prehistory.

At the opening of the fiscal year Dr. Aleš Hrdlička, curator of physical anthropology, was engaged in anthropological and archeological investigations in Alaska that included the lower Nushagak River, Bristol Bay, the Iliamna Lake regions, portions of Kodiak Island and adjacent areas. Interesting results were obtained throughout, with especially important materials coming from Kodiak Island, where there was found abundant evidence of a culture that shows evidence of considerable age. This shows interesting relationships on one hand to the Eskimo and on the other to the Northwest coast area. In May, 1932, Doctor Hrdlička returned to Alaska on his fifth expedition to that interesting area, centering his efforts this year on the Kodiak Island deposits discovered at the close of the season last year. Through the interest of Mrs. Charles

D. Walcott he was provided with a small motorboat for use in the bays about the coast of the island.

Dr. Walter Hough, head curator of the department of anthropology, examined the archeological field opened up by Dr. Byron Cummings around Tucson, Ariz., where huge adobe walled ruins are being excavated.

Work abroad in the interests of the Springer Collection, again undertaken by Dr. R. S. Bassler, head curator of the Department of Geology, embraced a study of the crinoid collections of various museums, particularly in England, Austria, and Hungary, and explorations in certain of the classic geologic areas of these countries. The entire trip was very successful and resulted in many casts of fossil echinoderm types, particularly Silurian crinoids hitherto wanting in the collections.

Dr. W. F. Foshag, curator of mineralogy and petrology, engaged in explorations in the States of Coahuila, San Luis Potosi, Zacatecas, and Queretaro, Mexico, under the auspices of the Roebling fund of the Smithsonian Institution. Complete series of the rocks and ores of the districts visited were collected, resulting in many important additions to the Roebling Collection in the National Museum.

James Benn, junior aid in the Department of Geology, made certain collections in southern New York and northern New Jersey. Of particular interest are fine examples of fluorescent minerals obtained at Franklin Furnace, N. J.

Late in the year E. P. Henderson, assistant curator of physical and chemical geology, traveling under the Canfield fund of the Smithsonian Institution, was detailed to collect in Montana, Utah, and Colorado, with certain needs of the collections as his objective. He was accompanied by F. A. Gonyer, representing the mineralogical department of Harvard University.

For the advancement of his work on the Cambrian, Dr. Charles E. Resser, curator of stratigraphic paleontology, spent four months in a study of early Paleozoic fossils in European museums and in consultation with geologists concerning the local stratigraphy of the neighboring areas. His work began in Norway and Sweden and extended to Czechoslovakia, Poland, Estonia, Germany, and England. His major objectives were attained to a greater degree than expected, and in addition much new material was secured for the Museum by exchange arrangements.

Dr. G. A. Cooper, assistant curator of stratigraphic paleontology, collected during his vacation, at his own expense, in classical Devonian localities in New York State. At the close of his work he presented to the Museum more than 2,500 specimens.

The field explorations of C. W. Gilmore, curator of vertebrate paleontology, covering the Miocene and Oligocene formations of

southwestern Montana, and the Wasatch of the Bighorn Basin, Wyo., met with gratifying success. The material collected will fill long-existing gaps in the collections, and it is anticipated that study will reveal many undescribed forms.

Excavations were continued in the fossil-horse quarry near Hagerman, Idaho, under the direction of Norman H. Boss, chief preparator in the division of vertebrate paleontology, resulting in the recovery of 4 more or less complete articulated skeletons, 32 skulls, 48 jaws, and a vast assemblage of skeletal parts.

The Walter Rathbone Bacon traveling scholarship under the Smithsonian Institution has been awarded for the current period to Alan Mozley for study of the land and fresh-water molluscan fauna of Siberia. Mr. Mozley left for the field in the spring of 1932 and proceeded to Tomsk, Siberia, where he intends to establish headquarters for this year's exploration. Mr. Mozley reports that he will make an expedition to the mouth of the River Ket, and later, after returning to Tomsk, will make an excursion south into the Akhmolinsk Steppe. He reports cordial cooperation of the local authorities and scientific institutions.

Dr. J. M. Aldrich, curator of insects, collected Diptera in the Gaspé Peninsula of eastern Quebec. He obtained a large collection of flies, establishing the fact that a large number of southern species have a much wider distribution northwards than has hitherto been supposed, though the lower St. Lawrence River appears to form a sufficient barrier against the spread of the northern flies southward, as no striking forms of the Labrador fauna were found.

Dr. Paul Bartsch, curator of mollusks, with financial assistance from the Carnegie Institution of Washington, again visited the Florida Keys to examine the Cerion colonies planted during previous years to determine the effect on these mollusks of changes in environment, as well as of hybridization, a work in which the Smithsonian Institution and the Carnegie Institution have cooperated since 1912.

Gerrit S. Miller, jr., curator of mammals, traveling at his own expense, with some assistance from the Smithsonian for the hire of labor, visited Puerto Rico during March and April with the main object of continuing his studies of the recently extinct mammal fauna of the Greater Antilles. Important localities were investigated and many specimens were obtained representing mammals, reptiles, batrachians, plants, and aboriginal artifacts.

Dr. Waldo L. Schmitt, curator of marine invertebrates, with the cooperation of the Carnegie Institution of Washington, continued a survey of the carcinological fauna of the Tortugas region at the Carnegie Marine Laboratory at Tortugas.

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Dr. Hugh M. Smith, in Siam, continued explorations throughout the year, sending to the National Museum large collections of vertebrates and mollusks which have been found to include numerous forms new to science. Thanks to Doctor Smith, the Museum is assembling a most excellent representation of the life of a region from which it had previously possessed little material.

W. G. Sheldon and Richard Borden, interested particularly in mammals, arranged a 3-month trip at their own expense into northeastern British Columbia, where they secured for the Museum a considerable collection that contains many forms of especial interest. The principal objective was to obtain specimens of a peculiar form of mountain sheep and as representative a series of other mammals as possible, in which the collectors were highly successful. The collections, including certain birds as well as mammals, have been presented to the National Museum. Thanks are due the Canadian Government for the necessary permits covering the taking of scientific specimens.

Dr. A. Wetmore, assistant secretary, visited the Bear River marshes at the northern end of Great Salt Lake, Utah, where he obtained various specimens of birds required in the Museum series. The region is one famous for its waterfowl, being now in large part included in a Federal refuge, and is an area from which the Museum has extensive collections.

BUILDINGS AND EQUIPMENT

The erection of the steel galleries in the Natural History Building for the mammal collections was completed at the end of August. A pneumatic collecting and conveying system for removing sawdust from the two woodworking rooms in the carpenter shop was installed, an important improvement long needed.

The power plant was in operation from October 5, 1931, until May 27, 1932. The consumption of coal during the year was 3,220.4 tons, at an average cost per ton of $5.03. The total electric current produced amounted to 628,578 kilowatt-hours, at a cost of 1.65 cents a kilowatt-hour. The ice plant manufactured 424.2 tons of ice at an average cost of $2.36 a ton.

MISCELLANEOUS

The exhibition halls of the National Museum were open during the year on week days from 9 a. m. to 4.30 p. m. and on Sundays from 1.30 p. m. to 4.30 p. m., with the exception of the Aircraft Building, which was open only on week days. All buildings remained closed during the day on Christmas and on New Year's.

Visitors for the year totaled 1,630,030, a decrease of 39,110 from the record of the preceding year, this difference being due partly to

the fact that the Aircraft Building was closed on Sundays. Attendance in the several buildings was recorded as follows: Smithsonian Institution, 241,844; Arts and Industries Building, 675,435; Natural History Building, 600,535; Aircraft Building, 112,216. The average daily attendance for week days was 4,237 and for Sunday 5,927.

During the year the Museum published 10 volumes and 57 separate papers, while the distribution of volumes and separates to libraries and individuals aggregated 101,975 copies. In addition, 18,805 copies of publications issued during this and previous years were supplied in response to special requests.

In the Department of Arts and Industries the divisions of mineral and mechanical technology were consolidated on July 18, 1931, as a division of engineering, under Carl W. Mitman as curator. Dr. T. Dale Stewart was appointed assistant curator of the division of physical anthropology on July 1, 1931, and Horace G. Richards, who served as senior scientific aid in the division of mollusks from October 5, 1931, was given appointment on March 16, 1932, as assistant curator of the division. Dr. Charles L. Gazin on March 1, 1932, succeeded the late Dr. James W. Gidley as assistant curator in the division of vertebrate paleontology, and Joseph H. Riley on June 24, 1932, succeeded the late Dr. Charles W. Richmond as associate curator in the Division of Birds. Dr. C. W. Stiles was given the honorary designation of associate in zoology under the Smithsonian Institution October 1, 1931, and Dr. Maurice C. Hall was appointed to the custodianship of the helminthological collections from the same date. Dr. D. C. Graham's association with the Museum was recognized by his appointment on October 19, 1931, as collaborator in biology, an honorary title which was also extended at the same time to Dr. A. K. Fisher. Dr. C. Dwight Marsh was appointed custodian of freshwater copepods in the division of marine invertebrates on July 10, 1931, and J. Townsend Russell's honorary appointment as collaborator in Old World archeology was extended for one year from May 13, 1932.

The following employees left the service through operation of the retirement act: Charles S. Atkins, laborer; Frederick W. Wilson, guard; Evan D. Lewis, guard; and Miss K. A. Gallaher, under library assistant. Further, under compulsory retirement for age provided as an economy measure in the legislative appropriation act for 1933, 12 employees went off the rolls at the close of the fiscal year, several having served the Museum long in positions of trust and authority. The list follows: William de C. Ravenel, administrative assistant to the secretary, with 48 years of service; Barton A. Bean, assistant curator of fishes, with 51 years of service; James G. Traylor, appointment clerk, with 50 years of service; Harry C. Taylor, chief of the paint shop, with 44 years of service; Andrew

Lee Young, assistant to the engineer, with 41 years of service; Richard A. Allen, senior scientific aid in the department of anthropology, with 35 years of service; Carl A. Carlsson and Lewis Jones, guards; William Jones, under mechanic, with 23 years of service; and Charles S. Washington, Albert Strong, and James S. Peyton, laborers, with 36, 23, and 15 years, respectively.

Through death the Museum lost five workers from its active roll, as follows: Dr. Charles W. Richmond, associate curator of birds, May 19, 1932; Dr. James W. Gidley, assistant curator of mammalian fossils, September 26, 1931; William S. Frazee, guard, March 15, 1932; Michael A. Coleman, guard, May 17, 1932; Mrs. Theresa Dimmick, forewoman of charwomen, on October 18, 1931.

From its honorary list of workers the Museum lost by death Dr. David Starr Jordan, associate in zoology, on September 19, 1931, and Dr. C. Dwight Marsh, custodian of fresh-water copepods, on April 23, 1932. The Museum lost a benefactor of note by the death of Rudolf Eickemeyer, of Yonkers, N. Y., on April 24, 1932. A few years ago Mr. Eickemeyer presented the Museum with his unique collection of pictorial photographs and historical specimens relating to photography, and by his will established a trust fund of $10,000, the income of which after the death of his widow is to be used for maintenance and collection in the section of photography.

Respectfully submitted.

ALEXANDER WETMORE,
Assistant Secretary.

Dr. C. G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 2

REPORT ON THE NATIONAL GALLERY OF ART

SIR: I have the honor to submit herewith my report on the operations of the National Gallery of Art for the fiscal year ending June 30, 1932.

The year has not been marked by any event of unusual importance or by the addition of art collections of exceptional value. The most noteworthy event of the year was the assignment of certain portions of the gallery space to the George Washington Bicentennial Commission for its exhibits of art works during 1932. Certain radical changes in the exhibition spaces were required; and since the gallery occupies the north hall of the National Museum, all changes made were directed by the officers of the Museum.

During the year much progress has been made toward the completion of the gallery card catalogues, which are (1) a comprehensive general catalogue of the art works of the Institution, not, however, including the Freer collection; (2) a portrait catalogue (275 numbers); (3) a catalogue of loans (64 numbers), and (4) a catalogue of the Ranger purchases from the beginning (99 numbers).

THE NATIONAL GALLERY OF ART COMMISSION

The eleventh annual meeting of the gallery commission was held at the Smithsonian Institution on December 8, 1931. The members present were Gari Melchers, chairman; Frank J. Mather, jr., vice chairman; W. H. Holmes, secretary; and Charles L. Borie, jr., James E. Fraser, Charles Moore, E. C. Tarbell, and Dr. Charles G. Abbot, ex officio. The following officers, whose terms expired automatically on this date, were reelected to serve during the ensuing year: Gari Melchers, chairman; Frank J. Mather, jr., vice chairman; and William H. Holmes, secretary of the commission. The following members were recommended to serve for the succeeding term of four years: James E. Fraser, Joseph H. Gest, Frank J. Mather, jr., and Edmund C. Tarbell. The death of the following members of the commission was announced: James Parmelee, on April 19, 1931; Daniel Chester French, on October 7, 1931; and W. K. Bixby, on October 29, 1931. Col. George B. McClellan, Thomas Cochran, and Paul Manship were recommended to fill the vacancies thus occasioned. (Mr. Cochran declined.)

Favorable report was made on acceptance of the following art works:

Portrait of Henry Ward Ranger, by Albert Neuhuys, presented by Frederick Ballard Williams.

Portrait of Henry Ward Ranger, by Alphonse Jongers, presented by James E. Fraser.

Painting by Emanuel Leutze (1816–1868), the preliminary sketch for his great fresco in the Capitol Building at Washington, known as Westward the Course of Empire Takes Its Way. Presented to William H. Seward by the artist. Bequest of Miss Sara Carr Upton.

SPECIAL EXHIBITIONS

An exhibition of paintings made in Spain and exhibited in the Salon de Exposiciones del Museo Nacional de Arte Moderno, Madrid, in 1928, as "Corners in Spain," the work of Wells M. Sawyer, was held from October 24 to November 30, 1931. It comprised 44 oil paintings and 24 water colors. Cards for the opening view were issued, and a catalogue was supplied by the gallery.

An exhibition in honor of the bicentennial of the birth of George Washington, of paintings, sculpture, plans of Washington City, etc., was opened under the auspices of the United States Bicentennial Commission and the National Commission of Fine Arts. Participating societies include the National Sculpture Society, National Capital Park and Planning Commission, National Gallery of Art, American Society of Landscape Architects, American City Planning Institute, National Society of Mural Painters, American Academy in Rome, American Institute of Architects, American Federation of Arts, and National Conference on City Planning. Invitations for the opening exercises on March 26 were issued by the commission, and a catalogue of exhibits has been made available by the District of Columbia George Washington Bicentennial Commission. The exhibition will close on Thanksgiving Day, November 24, 1932.

ART WORKS RECEIVED DURING THE YEAR

Accessions of art works by the Smithsonian Institution, subject to transfer to the National Gallery on approval of the advisory committee of the National Gallery of Art Commission, are as follows:

Portrait of Henry Ward Ranger, by Alphonse Jongers, A. N. A., formerly lent by the Council of the National Academy of Design. Gift of James Earle Fraser, New York, N. Y. (Accepted by the commission December 8, 1931.)

Portrait of Maj. Gen. Henry Tureman Allen, United States Army, and portrait of Gen. Robert Lee Bullard, LL. D., United States Army, by Seymour Stone. Gift of Chester D. Pugsley, Peekskill, N. Y.

Portrait of Rear Adm. Richard Evelyn Byrd, United States Navy (ret.), by Seymour Stone. Gift of the artist.

Two water-color paintings of British India: Peshawar City from the Fort, and Street in Ajmor, by William Spencer Bagdatopoulos. Gift of the artist.

Portrait of Dr. William H. Holmes, by E. Hodgson Smart. Gift of the artist.

John Gellatly added three framed photographs to the contents of the portfolio of the Gellatly Collection—one of himself, one of a portrait bust of himself by Serge Youriévitch, and one of the royal coat of arms of Scotland. The latter bears the label:

> The great Scotch authority decided that the Gellatly family's ancestor was the Scotch King William the Lion who reigned as King of Scotland from the year 1165 to the year 1214, and as Royal blood flows through the Gellatly veins they are entitled to use as their own the Royal armorial arms of Scotland.

Portrait (full length) of John Gellatly, by Irving R. Wiles, N. A. Gift of the artist to the Smithsonian Institution "for association with the Gellatly Collection." Deposited by the Smithsonian Institution.

LOANS ACCEPTED BY THE GALLERY

A painting by George DeForest Brush, N. A., entitled "Indian Burial"; lent by Mrs. George DeForest Brush.

Marble bust of Charles Evans Hughes, Chief Justice of the United States, and plaster bust of Gen. John J. Pershing, by Moses W. Dykaar; lent by the sculptor.

Plaster bust of Percy Bysshe Shelley, English poet (1792–1822), by William Ordway Partridge (1861–1930); lent by Mrs. William Ordway Partridge.

Framed miniature of A Lady, by Alta E. Wilmot, as a good example of American miniature painting of the present time; lent by the artist.

Portrait of Gen. John J. Pershing, United States Army, and portrait of Adm. William S. Sims, United States Navy, by E. Hodgson Smart; lent by the artist.

Portrait of Mrs. Charles Eames, by S. Gambardella; lent for the summer by Mrs. A. Gordon-Cumming.

DISTRIBUTIONS

Portrait of George Washington, by Rembrandt Peale, property of Hon. Charles S. Hamlin; withdrawn by the owner.

Portrait of Alexander Hamilton, by John Trumbull, and portrait of Fisher Ames, by Gilbert Stuart; withdrawn by their owner, Henry Cabot Lodge, jr.

Bust in plaster of Calvin Coolidge, by Moses W. Dykaar, a gift of the sculptor to the gallery, and a similar bust of Gen. John J. Pershing, lent by the sculptor, were withdrawn by Mr. Dykaar for further work. The marble bust of Hon. Nicholas Longworth was delivered to the custody of the United States Capitol.

Portrait of George Washington, by Charles Willson Peale, the property of John S. Beck, Washington, D. C., and portrait of Dr. William Shippen, by Gilbert Stuart, the property of Dr. L. P. Shippen, Washington, D. C., were temporarily withdrawn by the owners for the Bicentennial exhibition of portraits of George Washington and his associates at the Corcoran Gallery of Art. It is expected that these will be returned to the gallery after the close of the celebration, November 24, 1932.

The original working model in plaster of the bronze equestrian statue of Lafayette erected in the Square of the Louvre by the school children of the United States in 1901, a gift to the gallery from the sculptor, Paul Wayland Bartlett, N. A. (1865–1925), was lent to Mrs. Bartlett for a special exhibition of her husband's works to be held at the American Academy of Letters, New York City, opening November 12, 1931, to be returned about May 1, 1932. The statue has not yet been returned to the gallery.

Four portraits—Adm. Holdup Stevens, 2d, by Robert Hinckley, and Mrs. Stevens, his wife, artist unknown; Mrs. John Bliss, artist unknown; and Hon. Eben Sage, by Chester Harding—were withdrawn by the lender, Mrs. Frederick C. Hicks, Washington, D. C.

Portrait of George Washington; withdrawn by the owner, William Patten, Rhinebeck, N. Y.

Five paintings—Madonna and Child, by Albertinelli; Portrait of Christ, by Georgioni; The Doctor's Visit, by Jan Steen; Baptism of Christ, by Tiepolo; and Small Landscape, by Gainsborough—were withdrawn from her collection by Mrs. Marshall Langhorne in November, 1931. The Entombment, by Van der Weyden, has also been withdrawn by Mrs. Langhorne to be restored and varnished.

A water-color painting, Dogwood Blossoms, by Elizabeth Muhlhofer; withdrawn by Miss Muhlhofer.

Portrait of Mrs. Charles Eames, by Gambardella, lent for the summer by Mrs. A. Gordon-Cumming, was withdrawn in the autumn.

THE HENRY WARD RANGER FUND PURCHASES

The paintings purchased during the year by the Council of the National Academy of Design from the fund provided by the Henry Ward Ranger bequest, which under certain conditions are prospective additions to the National Gallery collections, are as follows, including the names of the institutions to which they have been assigned:

Title	Artist	Date of purchase	Assignment
		1931	
85. Woman in Cloak	Robert Henri, N. A.	December	Museum of Brooklyn Institute of Arts and Sciences.
86. In My Studio	Leopold Seyffert, N. A.	do	Museum of Brooklyn Institute of Arts and Sciences.
87. Eagle Lake	Jonas Lie, N. A.	do	Iowa Memorial Union, State University of Iowa, Iowa City, Iowa.
88. Frances	Frederick Karl Frieseke, N. A.	do	Washington County Museum of Fine Arts, Hagerstown, Md.
89 The Black Cloud	Eugene Higgins, N. A.	do	A. A. Anderson Gallery of Art, College of William and Mary, Richmond, Va.
		1932	
90. Summer	W. L. Lathrop, N. A.	January	The Dudley Peter Allen Memorial Art Museum, Oberlin College, Oberlin, Ohio.
91. Joseph Pennell	Wayman Adams, N. A.	do	Addison Gallery of American Art, Phillips Academy, Andover, Mass.
92. The Fall Season	Bruce Crane, N. A.	do	University of Nebraska, School of Fine Arts, Lincoln, Nebr.
93. Street Shrine	Jerome Myers, N. A.	do	Museum of Brooklyn Institute of Arts and Sciences.
94. Fishermen	Eric Hudson, A. N. A.	do	Topeka High School, Topeka, Kans.
95. Nancy (palette-knife sketch).	Geo. DeForest Brush, N. A.	February	California Palace of the Legion of Honor, San Francisco, Calif.
96. New Year Shooter	George Luks	April	Gallery of Fine Arts, Yale University, New Haven, Conn.
97. Snow Fields	Rockwell Kent	do	The Minneapolis Institute of Arts, Minneapolis, Minn.
98. Shapes of Fear	Maynard Dixon	do	Museum of Brooklyn Institute of Arts and Sciences,
99. Easterly Coming	Charles H. Woodbury, N. A.	June	Society of Liberal Arts, Joslyn Memorial, Omaha, Nebr.

PUBLICATIONS

HOLMES, W. H. Report on the National Gallery of Art for the year ending June 30, 1931. Appendix 2, Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1931, pp. 43–53.

LODGE. J. E. Report on the Freer Gallery of Art for the year ending June 30, 1931. Appendix 3, Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1931, pp. 54–59.

Catalogue of paintings made in Spain and exhibited in the Salon de Exposiciones del Museo Nacional de Arte Moderno, as "Corners in Spain," the work of Wells M. Sawyer, on view in the National Gallery of Art, United States National Museum Building, October 24 to November 30, 1931. Pp. 1–9.

George Washington Bicentennial Exhibition of Commemorative Paintings, Sculpture, and the Plan of Washington, at the National Gallery of Art, Constitution Avenue at Tenth Street, Washington, D. C., March 26 to November 24, 1932. Prepared at the request of the United States George Washington Bicentennial Commission by the National Commission of Fine Arts. This catalogue is being made available by the District of Columbia George Washington Bicentennial Commission. Pp. 1–27.

The George Washington Bicentennial Frieze. Painted by a group of members of the National Society of Mural Painters to commemorate the two hundredth anniversary of the birth of George Washington, National Gallery of Art, Washington, D. C., 1932. Pp. 1–14.

Respectfully submitted.

W. H. HOLMES, *Director.*

Dr. C. G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 3

REPORT ON THE FREER GALLERY OF ART

SIR: I have the honor to submit the twelfth annual report on the Freer Gallery of Art for the year ending June 30, 1932:

THE COLLECTIONS

Additions to the collections by purchase are as follows:

BOOKBINDING

31.30. Persian, 16th century. Painted lacquer binding of the volume *Khusraw ū-Shīrīn*, by Nizāmī. (See below under *Manuscripts*, 31.29, and *Paintings*, 31.31–31.37.)

BRONZE

32.13. Chinese, 3d century B. C. (?) Ch'in dynasty (?). A ceremonial food vessel with three ducks on the cover; the body has two annular handles and is ornamented with two horizontal bands of interlacing scroll design in delicate relief. Areas of green, blue, and red patination.

32.14. Chinese, Han dynasty (3d c. B. C.–3d c. A. D.). Fire-gilt dragon head: A terminal ornament for a chariot pole. Areas of green patination.

32.15–32.16. Chinese, Han dynasty. Two chocks, possibly chariot fittings, ornamented with a formal design inlaid in gold and silver.

CERAMICS

31.18. Chinese, 12th–13th century. Sung dynasty. Tz'ŭ-chou type. A tall, wide-lipped flask, glazed in cream-white, and ornamented with a wide band of carved floral design.

32.23. Persian, 12th–13th century. Rhages. Spouted pitcher with a bird in high relief on the handle. Ornamented with a band of figures of men and animals, in slight relief, showing traces of color and gold.

JADE

31.19. Chinese, Han dynasty. Oval cup, white, with flanged rim. The outer surface ornamented with a "rice-grain" pattern, the inner with delicate linear designs. The flanges are pierced.

MANUSCRIPTS

31.24. Arabic (Egypt), 14th century. Illuminated title leaf from a *Qur'an*. Paper.

31.29. Persian, 15th century. A bound book, *Khusraw ū-Shīrīn*, by Nizāmī. Painted lacquer binding (see above under *Bookbinding*, 31.30), illuminated title leaf and six miniatures. (See below under *Paintings*, 31.31–31.37.)

32.1–32.2. Arabic (Egypt), 14th–15th century. First two leaves from a *Qur'ān;* gold and blue illuminations on paper.

32.3. Persian, early 16th century. A bound book, *Mihr-ū-Mushtari*, by 'Assār of Tabriz; dated to correspond with A. D. 1522. Illuminated first leaf and four miniatures. (See below under *Paintings*, 32.4–32.8.)

32.17. Arabic (Egypt), 16th century. The *Qur'ān*, in one volume. Text in black *naskhī;* richly illuminated; paper, untrimmed.

32.18. Armenian, 11th century. The Four Gospels in one volume (18th–19th century binding). Parchment leaves. Text in vertical uncials, black and golden; Ammonian sections in sloping uncials, golden. Illuminated title pages, initials, and paragraphs, and 163 miniature paintings. Color and gold.

32.24. Indian, 15th century, Gujarātī. An illuminated scroll: *Vasanta Vilāsa*, a poem on spring. Text in red, black, blue, and yellow; 79 miniatures. Color on cotton.

PAINTINGS

31.20. Indian, Mughal, 17th century. School of Jahāngīr. An album leaf: *Darbar* of Jahāngīr. Color and gold on paper.

31.21. Persian, 14th century, Mongol period. Leaf from a *Shāhnāmah*: Siyawush taken prisoner by Afrasiyab. Color and gold on paper.

Persian, 15th century. Two leaves from a *Lailā ū-Majnūn*:

31.22. The battle between the Arab chief Noufal and the tribe of Lailā;

31.23. Majnūn visited in the wilderness by the *sheikh* Salīm.
Color and gold on paper.

Indian, late 16th century. School of Akbar. Four leaves from the original MS. of the *Tarīkh-ī-Alfī* (Chronicle of a thousand years):

31.25. The capture of Baghdad by Tāhir;

31.26. The Imām of Baghdad brought before the Caliph on a charge of heresy, attributed to Basāwan;

31.27. A banquet given by the Caliph al-Mutawakkil, by Tiriyyā and Brispat;

31.28. Muwayyad put to death in the ice.
Color and gold on paper.

31.31. Persian, 17th century. Leaf from a *Khusraw ū-Shīrīn*, by Niẓāmī (see above under *Manuscripts*, 31.29). An interpolated painting of a later date than the book, a *Shi'a* subject showing the Prophet and 'Alī with twelve companions. Color and gold on paper.

Persian, 15th century. Six leaves from a *Khusraw ū-Shīrīn*, by Niẓāmī (see above under *Manuscripts*, 31.29):

31.32. Khusraw catches sight of Shīrīn bathing in a pool;

31.33. A hunting scene;

31.34. The sculptor Farhād brought by Shapur into the presence of Shīrīn;

31.35. Shīrīn makes a visit to Farhād at work;

31.36. Khusraw returns to the castle of Shīrīn;

31.37. An illuminated frontispiece and head piece.
Color and gold on paper.

Persian, early 16th century. Five leaves from a *Mihr ū-Mushtarī*, by 'Assār of Tabriz. (See above under *Manuscripts*, 32.3):

32.4. An illuminated frontispiece;

32.5. Prince Mihr and his friend at school;

32.6. Mihr slays a lion at one blow;

32.7. Mihr feasted in a garden by the king of Khwarizm;

32.8. The nuptials of Mihr and Nahīd.
Color and gold on paper.

32.9. Persian, 16th–17th century, Safavid school. By Aqa Riza. Lady with a fan. Color and gold on paper.

32.10. Indian, 17th century. Rājput. Pahāṛī, Basohli school. A lady and attendant beside a lotus pool. Color, gold and silver (oxidized) on paper.

32.11. Indian, early 19th century, Rājput. Pahāṛī, Kāṅgṛā. Dressing the bride. Color and gold on paper.

32.12. Indian, 18th–19th century. Rājput. Pahāṛī, Garhwāl. By Mola Rām (1760–1833). Kṛṣṇa holding the hill Govardhana to protect the people of Brṇdaban and their cattle from the rain poured down by Indra. Color and gold on paper.

32.19. Arabic (Northern Mesopotamia), middle 14th century. Leaf from a copy after the 13th century treatise on *Automata* by al-Jazarī: part of a water-clock with the figure of a man seated on a balcony, the so-called "Saladin" figure. Color and gold on paper.

Arabic, early 13th century. Baghdad school. By Abdallāh ibn al-Fadl. Three leaves from an Arabic translation of the pharmacological treatise of Dioscorides:

32.20. Two physicians preparing medicine;

32.21. Two men preparing to sow seed;

32.22. A physician and his assistant under a fruit tree. Color and gold on paper.

SILVER-GILT

31.17. Chinese, T'ang dynasty. A covered cup, ornamented with delicate line engraving.

Curatorial work within the collection has been devoted to the completion of a detailed study of a Japanese *mandara* painting (29.2); to a study of the Indian manuscript, *Vasanta Vilāsa* (32.24); to a critical study of the ancient Armenian manuscript of the Four Gospels (32.18)—a work still in progress at the time of this report; and to the study and recording of inscriptions on certain Buddhist stone sculptures and of inscriptions and seals on Chinese paintings. In the section of Near Eastern painting, translations of the text on recently acquired Persian manuscripts have been made and recorded, and the subjects of the miniatures identified. Besides these textual studies, the usual work involved in cataloguing new acquisitions in metal, jade, bronze, and painting has occupied members of the staff. The Fenollosa collection of lantern slides of Chinese, Japanese, and other Eastern subjects, numbering approximately 3,000, all without labels, as acquired by Mr. Freer in 1909, has been worked over, subjects identified as far as possible, and the slides labeled and stored. These are now available as illustrative material, in addition to the Freer collection slides.

During the year 1,155 objects and 399 photographs of objects were submitted to the curator by other institutions or by private persons for expert opinion as to their identity, provenance, or historical or esthetic value. Twenty-six inscriptions were submitted for translation. Reports on these things were made to owners or senders.

THE LIBRARY

During the year the library has been increased by 254 volumes, 32 unbound periodicals, and 41 pamphlets. In addition, 122 bulletins, reports, and catalogues were received.

Since the date of the last report the cataloguing of the library has been completed. Indexing of foreign periodical publications, including bound volumes of *Kokka* and *T'oung Pao*, has been begun.

LECTURES

Lectures offered to the public during the past year have been as follows:

In November—A series of lectures with lantern slides on The Literary Backgrounds of Islamic Painting in Persia, by Sir E. Denison Ross, of the School of Oriental Studies, London—

November 21: The Epics.
November 23: Timurid Literature.
November 25: Safavid Literature.

On Friday, January 22, an illustrated lecture on the excavations at the Tell Halaf in northern Syria, entitled "The Wonders of the Tell Halaf," by the excavator, Dr. Baron Max von Oppenheim.

On Tuesday, March 1, an illustrated lecture on The Ancient Art of Siberia, by Dr. Alfred Salmony, director of the Museum für Ostasiatische Kunst, Cologne.

ATTENDANCE

The gallery has been open every day from 9 until 4.30 o'clock, with the exception of Mondays, Christmas Day, and New Year's Day.

The total attendance of visitors coming in at the main entrance was 122,940—week days, 78,247; Sundays, 44,693. This year the average Sunday attendance was more than three times that of an average week day, 859 being the average for Sunday and 251 that for a week day. As before, the highest monthly total attendances were reached in April (14,655) and August (12,653); the lowest attendance was, as usual, in December (6,573).

The total lecture attendance was 825, with an average of 165. Together with visitors admitted to the offices on Mondays (15), the total attendance at the gallery during the year was 123,780.

There were 1,901 visitors to the offices during the year. Of these, 91 came for general information, 268 to see objects in storage, 37 to examine the building and installation, 142 to study in the library, 187 to see the facsimiles of the Washington manuscripts, 35 to get permission to make photographs and sketches, 229 to examine or purchase photographs, 114 to submit objects for examination, 482

to see members of the staff. Fifty-four groups, ranging from 1 to 43 persons (total, 168), were given docent service, and 15 groups, ranging from 4 to 19 persons (total, 133), were given instruction in the study rooms.

FIELD WORK

At the time of this writing a full report of recent archeological work undertaken by the field staff in Shansi Province, China, is being printed by Kelly & Walsh (Ltd.), of Shanghai. It will be printed in both English and Chinese, arranged *dos-à-dos*, and illustrated with numerous plates, line drawings, and plans.

A second and more comprehensive report, dealing with all the work accomplished by the field staff since 1922, and especially with the painted pottery sites excavated around Wan Ch'üan in Shansi, will follow the first. It will include several color plates, as well as the usual illustrative material, and will also be printed in both languages by the same firm.

PERSONNEL

Since October 28, Y. Kinoshita has been employed as mounter of oriental paintings and is now permanently employed at the gallery.

On March 23, 1932, the Freer Gallery suffered a loss in the death of Levin C. Handy, who since June 1, 1922, had done all of the photographic work at the gallery.

William Acker, student assistant, having completed his studies at the University of Leyden, is on his way to Washington where he will be attached to the Freer Gallery for the next several months.

Respectfully submitted.

J. E. Lodge, *Curator.*

Dr. C. G. Abbot,
Secretary of the Smithsonian Institution.

APPENDIX 4

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY

SIR: I have the honor to submit the following report on the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1932, conducted in accordance with the act of Congress approved February 23, 1931. The act referred to contains the following item:

American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, the excavation and preservation of archeologic remains under the direction of the Smithsonian Institution, including necessary employees, the preparation of manuscripts, drawings, and illustrations, the purchase of books and periodicals, and traveling expenses, $72,640.

M. W. Stirling, chief, left New York on September 26, 1931, as a member of the Latin American expedition to South America. The first region visited by the expedition was the San Blas coast of Panama. Here Mr. Stirling spent approximately a month in making an ethnological survey of the Tule Indians. From Panama the expedition proceeded to Ecuador, where three weeks were spent in investigating archeological sites in the Andean highlands in the vicinity of Cuenca. After crossing the Andes and descending to the frontier post of Mendez, three months were spent among the Jivaro Indians of the Santiago and Maranon Rivers. The expedition crossed the mountains from Mendez to the upper Yaupe River. They then descended the Yaupe to the Santiago, passing down this river to its junction with the Maranon. Much of the time was spent living with the Jivaros in their own houses, where Mr. Stirling was able to record first-hand a considerable quantity of ethnological data. In addition to this a collection was made representing the material culture of the Indians of the region. After a short excursion up the Alto Maranon, the expedition passed through the famous Pongo Manseriche, descending by rafts to Iquitos, from which point the collections were shipped by way of the Amazon River to the National Museum. Mr. Stirling returned to Washington on April 26, 1932.

Dr. John R. Swanton, ethnologist, was in the field from November 2 to December 6, 1931, his object being the location of the route followed by De Soto and Moscoso through Arkansas and Louisiana from 1541 to 1543. He was the guest for a part of this time of Col. John R. Fordyce, of Hot Springs National Park, Ark. More success was attained in determining the probable course of the Span-

iards than had been anticipated. While in the field he also collected linguistic material from the Tunica Indians near Marksville, La. There are supposed to be only three individuals who can still use the old tongue.

Dr. Swanton devoted a large part of his time to continuing preparation of the Handbook of the Southeastern Indians, and a beginning has been made on a bulletin to include the linguistic material of the Coahultecan tongues now extinct. The work of copying the tribal map of the Indians of North America has been practically completed.

Dr. Truman Michelson, ethnologist, was at work among the Southern Cheyenne at the beginning of the fiscal year. The object was to restore phonetically some Cheyenne words previously extracted from Petter's Dictionary which were clearly Algonquian in origin. Measurements were taken of some 23 subjects, and a good deal of new ethnological information was obtained. Near the middle of July Doctor Michelson left for Tama, Iowa, to obtain some additional material on Fox ceremonials. Early in August he left Iowa and went among the Northern Cheyenne to restore the list of Cheyenne words mentioned above according to Northern Cheyenne phonetics. Incidentally a really representative group of Northern Cheyenne were measured. A statistical study has shown that the vault of the skull is decidedly low as compared with that of most Algonquian peoples and rather resembles the skull of the Dakota Sioux. In June, 1932, Doctor Michelson again left for the field. He succeeded in gaining some important sociological data on the Kiowa and obtained some new facts on Cheyenne linguistics, sociology, and mythology.

John P. Harrington, ethnologist, made a thorough study of the Indians of Monterey and San Benito Counties, in central California, and investigated the little known Chingichngich culture of the coast of southern California. Working with the oldest survivors of the Costanoan and Esselen speaking Indians of Monterey and San Benito Counties, Mr. Harrington found it possible by fully utilizing all the early records and vocabularies to illuminate the former life of these people and to define it as clearly as that of some of the better known western groups. The study demonstrated that this culture indicates a key region for central California ethnology, since it proved to be a connecting link between the cultures of northern and southern California. These Indians lived on a wooded mountainous coast, the northern breaking down of the great Santa Lucia Range, in a broad interior valley, known in early times as *la canada del rio de Monterey* and now as the Salinas Valley, and in the hilly region between coast and valley, and east of the valley. The region was rich in fish, shellfish, game, and in vegetable foods and medic-

inal herbs. Labor was roughly divided between men and women, the men tending to the animal food and the women to the vegetable. The houses were built of poles and thatch, shaped like a half orange, with smoke hole at the top, and slightly sunk in the ground. The people lived in villages and were governed by the village chief and elders. One or more sweathouses were to be found at each village. The people hardened themselves to going the year around with little or no clothing in the mild climate, and the dense morning fogs did not keep them from rising at daylight and taking the daily morning plunge. A bride was taken to live at the house of her husband's people or to a new house built near there. A captain, or even an ordinary man, would sometimes have two or more wives, but monogamy was the rule. One of the important discoveries is that the people had clans.

From July 1 to September 22, 1931, Dr. F. H. H. Roberts, jr., archeologist, continued excavations at the site 3½ miles south of Allantown, Ariz., where work was started in May of the previous fiscal year. The Laboratory of Anthropology of Santa Fe, N. Mex., cooperated in the project through July and August. The summer's work resulted in the excavation of the subterranean portions of 14 structures. The excavations showed that several of the dwellings had been destroyed by fire. The charred remnants of timbers lying on the floors demonstrated clearly the method of roof construction. The details were so clearly shown in one of the houses that it was restored so that visitors to the site might see what dwellings of that type were like. Two other pits were covered with shed roofs so that they will be preserved for a long time to come. The Douglass method of determination gave dates ranging from 814 to 916 A. D. On February 1 Doctor Roberts left Washington for Yucatan, having been detailed to the Carnegie Institution of Washington in the capacity of consulting archeologist. He spent 10 days at Chichen Itza, during which time he gained much first-hand information concerning the character of the ancient Mayan civilizations, and also visited Uxmal, the pyramids at San Juan de Teotihuacan, and several other important archeological sites in the vicinity of Mexico City. While in Mexico City he had the opportunity of seeing and examining the various objects found at Monte Alban by the expedition under Prof. A. Caso. Doctor Roberts left Washington on May 21 to resume his researches at the site south of Allantown, Ariz. Excavations were commenced on June 2, and by June 30 the remains of two additional pit houses had been cleared of the accumulated débris, and the remains of seven slab-lined storage cists uncovered. In addition 15 burials belonging to the habitation group were found. One of the pit structures uncovered had been destroyed by fire, and

the charred timbers furnished one of the earliest building dates thus far obtained in the Southwest, namely, 797 A. D.

On July 10, 1931, Dr. W. D. Strong entered upon his duties as ethnologist in the bureau. Early in August he left for a reconnaissance trip through central and western Nebraska, central South Dakota, and western North Dakota. Evidence of a prehistoric culture believed to pertain to the early Pawnee was followed up the Republican River and west as far as Scottsbluff. Here a very important stratified site on Signal Butte was investigated, and after arranging for complete excavation the next summer, Doctor Strong continued the survey trip up the Missouri River. Many large prehistoric villages of the sedentary tribes in this region were visited and their locations and characteristics noted for future investigation. The survey ended with a visit to the living Arikara Indians on the Fort Berthold Reservation in North Dakota. Many good informants were visited and preliminary ethnological work on the life and customs of this very important agricultural people was commenced. During the autumn and winter of 1931–32 the text and illustrations of a manuscript entitled "An Introduction to Nebraska Archeology" were prepared.

On May 25, 1932, Doctor Strong left for Lincoln, Nebr., and on June 15 excavations were commenced in the stratified deposits on the top of Signal Butte. Large collections of specimens from all three levels were secured, especially from the lowest level of occupation, which was very thick and gave evidence of great antiquity. Marked cultural differences between the three levels were apparent during the excavation work. Burials, both complete and partial, were found in the upper level, but no burials were encountered in the lowest level, though fragments of human bone were found. It is already certain that the unusual case of stratigraphy present on the summit of Signal Butte will, when the material has been studied in detail, yield clear evidence of an extensive sequence of cultural and artifact types for the high plains region of central North America.

J. N. B. Hewitt, ethnologist, completed the revision and the editing of the manuscript journal of the Swiss artist, Rudolph Friederich Kurz, for publication by the bureau. He also made an intensive study of the internal organic structure of the Iroquois and the Huron (Wyandot) clan, which was a most important unit of social and political organization. This investigation revealed some hitherto unnoted and disregarded organic features of clan structure. The results of this study were submitted for publication. In addition he continued his work of coordinating the variant versions of traditional and ceremonial matters recorded in native text in the Mohawk, the Cayuga, and the Onondaga vernaculars. In addition to the four myths of the Wind Gods mentioned in the previous

report, five others of this series of texts were completed, as was also the paper dealing with the decipherment of an interesting series of mnemonic pictographs. Mr. Hewitt represents the Smithsonian Institution on the United States Geographic Board, and as a member of its executive committee has much active research work to do.

On May 11, 1932, Mr. Hewitt resumed his ethnological researches among the Iroquois members of the former Six Nations of Indians on the Grand River Grant, near Brantford, Ontario, Canada. His investigations began with a study of the permanency and the remaining cohesive power of the clan among these people, and of its influence, if any, on the social and political activities of these Indians to-day. He found what had been superficially apparent for some time, namely, that the clan structure and authority had become completely forgotten, and so maintained no effective guidance in social and political affairs. David Thomas, a former chief of the Cayuga and an intelligent man, of the Grand River Reservation, dictated a number of traditional and interpretative Cayuga texts dealing with certain phases of the ancient league rituals. John Buck, sr., a former Tutelo chief, supplied further information relating to the Wind Gods, and he also gave much assistance in interpreting league texts already recorded by Mr. Hewitt.

Winslow M. Walker, associate anthropologist, was in the field at the beginning of the year, exploring certain caves in the Ozark region of north central Arkansas. A large cavern at Cedar Grove yielded the burials of 12 individuals and a considerable number of artifacts and articles of rough stone, chipped flint, bone, shell, and crude undecorated potsherds heavily shell-tempered. The resemblance to the culture of the Ozark Bluff Dwellers described by M. R. Harrington is very marked. The skeletal remains indicate a long-headed people of moderate stature, the so-called "pre-Algonkin type." Three localities were found where there were petrographs—both carved and painted symbols and figures—but the designs at each of these sites were different and distinctive, and they could not be correlated with any of the Bluff Dweller caves.

In the middle of July Mr. Walker went to Louisiana, where for a month explorations of mound and village sites in various parts of northern Louisiana were undertaken, principally in the Red River and Mississippi Valleys. At Natchitoches, on Red River, while preparations were going on for the construction of some ponds for a new Government fish hatchery, an ancient Indian burial ground was discovered. Mr. Walker arrived in time to save some of the skeletal material and fragments of a beautiful highly decorated and polished pottery. The period from January to June was spent in the compiling of an index of all archeological sites so far reported

from the region of the lower Mississippi Valley, with maps showing the location of these sites in the States of Louisiana and Arkansas.

From the study of the material found at Natchitoches a paper has been prepared for publication entitled "Discovery of a Caddo Site at Natchitoches, Louisiana." The results of this study seem to justify the conclusion that this was the burial ground of the tribe of the Natchitoches, a branch of the Caddo, found inhabiting this location by Henri de Tonti in 1690. The beautiful polished and engraved pottery is very similar to that made by the Ouachita Indians living along the river of that name in Louisiana and Arkansas.

SPECIAL RESEARCHES

The study of Indian music was continued during the past year by Miss Frances Densmore, a collaborator of the bureau. The three outstanding results of the year's work are a study of the Peyote cult and its songs among the Winnebago Indians, an intensive study of the songs and customs of the Seminole in Florida, and the completion for publication of a manuscript entitled "Nootka and Quileute Music." In addition, numerous Pueblo songs recorded in 1930 have been transcribed and other Pueblo songs recorded. Eight manuscripts and the transcriptions of 109 songs have been submitted, together with the phonographic records and complete analyses of the songs.

Field trips were made to Wisconsin Dells in August and September, 1931. The first trip was devoted to the Pueblo work, the recording of Winnebago dance songs, and a continuance of the general study of the Winnebago. Following this a visit was made to a basket makers' camp near Holmen, Wis., where the ceremonial songs of the John Rave branch of the Peyote organization were recorded by William Thunder, a leader in the ceremony. On the second trip to Wisconsin Dells the ceremonial songs of the Jesse Clay branch of the organization were recorded by James Yellowbank, who is a leader in that branch. In September, 1931, and in June, 1932, the study of peyote was continued with Winnebago Indians.

On November 6, 1931, Miss Densmore arrived in Miami, Fla., to resume a study of the Seminole Indians begun in January. During the early part of her stay the work was conducted in the Seminole villages at Musa Isle and Dania and in three camps on the Tamiami Trail between Miami and Everglades. Sixty-five songs were recorded by Panther (known as Josie Billie), a leader in the Big Cypress band of the tribe. He is a medicine man in regular practice, and his work was sometimes interrupted by his attendance upon the sick.

Early in February Miss Densmore went to Fort Myers and made a trip to remote villages in the Everglades under the guidance of Stanley Hanson of that city. Then she went to the region west of Lake Okeechobee and recorded 125 songs at Brighton from Billie Stuart, a leader of singers in the Cow Creek group of Seminoles. Returning to Miami, work was resumed at Musa Isle. Additional songs were recorded by Panther, and an important tradition was related by Billie Motlo, one of the few remaining old men of the tribe.

MISCELLANEOUS

Seven bulletins of the bureau were issued during the year; for a list of these see the report on publications, Appendix 11.

In the library there were accessioned during the year 400 volumes, 150 pamphlets, and 3,400 serials. For further details see the report on the library, Appendix 10.

COLLECTIONS

Accession No.

115902. Collection of archeological material collected by M. W. Stirling at various sites in Alabama and Florida in 1931. (148 specimens.)

114568. Archeological and skeletal material collected for the Bureau of American Ethnology by F. M. Setzler from various sites in Texas in 1931. (69 specimens.)

115562. Archeological and ethnological objects collected for the Bureau of American Ethnology by Neil M. Judd on the San Carlos Indian Reservation, Gila County, Ariz. (49 specimens.)

115827. Specimens of shell from Horrs Island, Fla., collected by M. W. Stirling in 1931. (3 specimens.)

117184. Archeological material collected in 1931 by W. M. Walker from caves and rock shelters in the Ozark region of north central Arkansas, occupying portions of Searcy and Marion Counties. (23 specimens.)

During the course of the year information was furnished by members of the bureau staff in reply to numerous inquiries concerning the North American Indians, both past and present, and the Mexican peoples of the prehistoric and early historic periods. Various specimens sent to the bureau were identified and data on them furnished for their owners.

Personnel.—Dr. William Duncan Strong was appointed as ethnologist on the staff of the bureau on July 10, 1931. Miss Marion Illig was appointed as junior stenographer on September 1, 1931. De Lancey Gill was retired as illustrator on June 30, 1932, by operation of the economy bill.

Respectfully submitted.

M. W. Stirling, *Chief.*

Dr. C. G. Abbot,
Secretary, Smithsonian Institution.

APPENDIX 5

REPORT ON THE INTERNATIONAL EXCHANGE SERVICE

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1932:

The congressional appropriation for the support of the service during 1932 was $54,060, an increase of $1,250 over that for 1931. Of this increase, $1,000 was for freight and $250 for boxes. The Institution received as repayments from departmental and other establishments $5,056.23, making the total resources available during the year $59,116.23.

The total number of packages received for distribution through the service, from both domestic and foreign sources was 759,035, an increase over the previous year of 117,697, or about 18 per cent. The greater part of this increase was in the parliamentary documents forwarded abroad.

The publications sent and received by the service are classified as parliamentary documents, departmental documents, and miscellaneous scientific and literary publications. The number and weight of packages containing the publications coming under these headings are as follows:

	Packages		Weight	
	Sent	Received	Sent	Received
			Pounds	*Pounds*
United States parliamentary documents sent abroad	362,377		118,433	
Publications received in return for parliamentary documents		11,974		31,674
United States departmental documents sent abroad	188,971		155,759	
Publications received in return for departmental documents		7,974		25,043
Miscellaneous scientific and literary publications sent abroad	146,866		227,425	
Miscellaneous scientific and literary publications received from abroad for distribution in the United States		40,873		102,316
Total	698,214	60,821	501,617	159,033
Grand total	759,035		660,650	

It will be seen from the foregoing table that about 75 per cent of the work of the office during the year has been conducted in behalf of United States governmental establishments.

The total number of boxes used in dispatching consignments abroad was 2,652, a decrease of 350 from the preceding year. Of these boxes, 605 were for the foreign depositories of full sets of

United States governmental documents, and the remainder (2,047) were for distribution to miscellaneous establishments and individuals.

While the Smithsonian Exchange Service, as a rule, transmits its consignments to other countries in boxes, it is more economical to forward certain shipments direct to their destinations by mail, and during the year the number of packages sent abroad in this manner was 85,435, an increase of 8,826 over the number mailed last year. The decrease in the number of boxes forwarded abroad in 1931 and 1932 and the increase in the number of packages transmitted by mail during the same period were due to the sending since January 1, 1931, of the greater part of the packages for British correspondents direct by mail.

FOREIGN DEPOSITORIES OF GOVERNMENTAL DOCUMENTS

The total number of sets of United States official documents forwarded to foreign depositories is 112, 62 full and 50 partial.

The full set of official documents sent to the Prefecture of the Seine has, at the request of the Library of Congress, been discontinued and forwarded to the American Library in Paris. The partial set of documents sent to Bengal is now addressed: "Assistant Secretary to the Government of Bengal, Department of Education, Writers' Buildings, Calcutta." The series of governmental documents sent to Northern Ireland are now addressed to the "Superintendent of His Majesty's Stationery Office, Custom House, Belfast." A list of the depositories is given in the report for 1931.

INTERPARLIAMENTARY EXCHANGE OF THE OFFICIAL JOURNAL

The following have been added to the list of those establishments receiving copies of the daily issue of the Congressional Record: Office Nationale du Commerce Extérieur, Paris; Reichsfinanzministerium, Berlin; Biblioteca Apostolica Vaticana, Vatican City. These three new depositories, after allowing for the elimination of the set sent to Barcelona, which was discontinued, make the total number of copies of the Congressional Record forwarded to foreign depositories 104.

The depository of the Record in Aracaju, Brazil, has been changed to Bibliotheca Publica de Sergipe, Aracaju. For a list of the states taking part in the immediate exchange of the official journal, together with the names of the establishments to which the Record is mailed, see the report for 1931.

A list of the agencies abroad through which the distribution of exchanges is effected is given below. Most of these agencies forward consignments to the Institution for distribution in the United States.

LIST OF EXCHANGE AGENCIES

ALGERIA, via France.
ANGOLA, via Portugal.
ARGENTINA: Comisión Protectora de Bibliotecas Populares, Calle Callao 1540, Buenos Aires.
AUSTRIA: Internationale Austauschstelle, Bundeskanzleramt, Herrengasse 23, Vienna I.
AZORES, via Portugal.
BELGIUM: Service Belge des Échanges Internationaux, Rue des Longs-Chariots, 46, Brussels.
BOLIVIA: Oficina Nacional de Estadística, La Paz.
BRAZIL: Serviço de Permutações Internacionaes, Bibliotheca Nacional, Rio de Janeiro.
BRITISH COLONIES: Crown Agents for the Colonies, London.
BRITISH GUIANA: Royal Agricultural and Commercial Society, Georgetown.
BRITISH HONDURAS: Colonial Secretary, Belize.
BULGARIA: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.
CANADA: Sent by mail.
CANARY ISLANDS, via Spain.
CHILE: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.
CHINA: Bureau of International Exchange, Academia Sinica, 331 Avenue du Roi Albert, Shanghai.
COLOMBIA: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.
COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
CUBA: Sent by mail.
CZECHOSLOVAKIA: Service Tchécoslovaque des Échanges Internationaux, Bibliothèque de l'Assemblée Nationale, Prague 1–79.
DANZIG: Amt für den Internationalen Schriftenaustausch der Freien Stadt Danzig, Stadtbibliothek, Danzig.
DENMARK: Service Danois des Échanges Internationaux, Kongelige Danske Videnskabernes Selskab, Copenhagen.
DUTCH GUIANA: Surinaamsche Koloniale Bibliotheek, Paramaribo.
ECUADOR: Ministerio de Relaciones Exteriores, Quito.
EGYPT: Bureau des Publications, Ministère des Finances, Cairo.
ESTONIA: Riigiraamatukogu (State Library), Tallinn (Reval).
FINLAND: Delegation of the Scientific Societies of Finland, Helsingfors.
FRANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.
GERMANY: Amerika-Institut, Universitätstrasse 8, Berlin, N. W. 7.
GREAT BRITAIN AND IRELAND: Messrs. Wheldon & Wesley, 2, 3, and 4 Arthur St., New Oxford St., London W. C. 2.
GREECE: Bibliothèque Nationale, Athens.
GREENLAND, via Denmark.
GUATEMALA: Instituto Nacional de Varones, Guatemala.
HAITI: Secrétaire d'État des Relations Extérieures, Port-au-Prince.
HONDURAS: Biblioteca Nacional, Tegucigalpa.
HUNGARY: Hungarian Libraries Board, Budapest, IV.
ICELAND, via Denmark.
INDIA: Superintendent of Stationery, Bombay.

ITALY: R. Ufficio degli Scambi Internazionali, Ministero dell' Educazione Nazionale, Rome.
JAMAICA: Institute of Jamaica, Kingston.
JAPAN: Imperial Library of Japan, Tokyo.
JAVA, via Netherlands.
KOREA: Sent by mail.
LATVIA: Service des Échanges Internationaux, Bibliothèque d'État de Lettonie, Riga.
LIBERIA: Bureau of Exchanges, Department of State, Monrovia.
LITHUANIA: Sent by mail.
LOURENÇO MARQUEZ, via Portugal.
LUXEMBURG, via Belgium.
MADAGASCAR, via France.
MADEIRA, via Portugal.
MEXICO: Sent by mail.
MOZAMBIQUE, via Portugal.
NETHERLANDS: International Exchange Bureau of the Netherlands, Royal Library, The Hague.
NEW SOUTH WALES: Public Library of New South Wales, Sydney.
NEW ZEALAND: Dominion Museum, Wellington.
NICARAGUA: Ministerio de Relaciones Exteriores, Managua.
NORWAY: Service Norvégien des Échanges Internationaux, Bibliothèque de l'Université Royale, Oslo.
PALESTINE: Hebrew University Library, Jerusalem.
PANAMA: Sent by mail.
PARAGUAY: Sección Canje Internacional de Publicaciones del Ministerio de Relaciones Exteriores, Estrella 563, Asunción.
PERU: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
POLAND: Service Polonais des Échanges Internationaux, Bibliothèque Nationale, Warsaw.
PORTUGAL: Secção de Trocas Internacionaes, Biblioteca Nacional, Lisbon.
QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Department, Brisbane.
RUMANIA: Bureau des Échanges Internationaux, Institut Météorologique Central, Bucharest.
RUSSIA: Academy of Sciences, Leningrad.
SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
SIAM: Department of Foreign Affairs, Bangkok.
SOUTH AUSTRALIA: South Australian Government Exchanges Bureau, Government Printing and Stationery Office, Adelaide.
SPAIN: Servicio de Cambio Internacional de Publicaciones, Paseo de Recoletos 20, Madrid.
SUMATRA, via Netherlands.
SWEDEN: Kongliga Svenska Vetenskaps Akademien, Stockholm.
SWITZERLAND: Service Suisse des Échanges Internationaux, Bibliothèque Centrale Fédérale, Berne.
SYRIA: American University of Beirut.
TASMANIA: Secretary to the Premier, Hobart.
TRINIDAD: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.
TUNIS, via France.
TURKEY: Robert College, Istanbul.

UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional de Publicaciones, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
VICTORIA: Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
YUGOSLAVIA: Ministère des Affaires Étrangères, Belgrade.

Respectfully submitted.

C. W. SHOEMAKER,
Chief Clerk, International Exchange Service.

Dr. CHARLES G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 6

REPORT ON THE NATIONAL ZOOLOGICAL PARK[1]

SIR: I have the honor to submit the following report on the operations of the National Zoological Park for the fiscal year ending June 30, 1932:

The regular appropriation made by Congress for the maintenance of the park was $255,540—an increase of $34,020 over 1931. Of this amount, $4,500 was made immediately available upon the approval of the act on February 23, 1931, for the construction of quarters to house the Victor J. Evans Collection. In addition, $4,500 was appropriated and made available upon approval of the act for the preparation of plans and specifications for the small mammal house, the next unit in the building program for the development of the Zoo.

ACCESSIONS

Gifts.—Chief among the gifts this year are Okero and Teddy, the baby mountain gorilla and chimpanzee, brought by Mr. and Mrs. Martin Johnson. These two animals are being raised together and constitute one of the most attractive exhibits in the park. The receipt of the mountain gorilla made it possible to exhibit both the lowland and mountain forms of this rare group. Samuel Kress, of the United Fruit Co., of Costa Rica, has continued his interest and sent a fine jabiru stork and a peccary. R. E. Stadelman, of the Serpentarium at Tela, Honduras, presented the park with Chancho, a white-lipped peccary, as well as a number of other interesting specimens. Vincent Astor, of New York City, presented two Galapagos iguanas. Acquisitions under the proceeds from the Frederic D. Barstow fund, which first became available for use this year, made possible the accession of a pair of tricolored squirrels, highly colored, active, and interesting little animals from the Malay Peninsula. The proceeds from the Frances Brinklé Zerbee Memorial Fund were used for keeping the aquarium section stocked.

NATIONAL ZOOLOGICAL PARK EXPEDITION

With funds provided especially in the regular appropriation act for the park, the director, accompanied by Assistant Head Keeper F. O. Lowe, sailed from New York July 22, 1931, for Georgetown, British Guiana. Collecting was carried on in two general regions—

[1] The complete list of animals in the collection, usually printed with this report, has had to be omitted this year owing to shortage of printing funds. Mimeographed copies of the list may be obtained by writing to the Director, National Zoological Park, Washington, D. C.

the Pomeroon and Mackenzie districts—and although the earlier portion of the trip was a disappointment, 317 specimens were successfully landed at the Zoo on October 11, 1931. These comprised 13 species of mammals, 25 species of birds, and 31 species of reptiles and amphibians. This exhibit brought a number of species into the Zoo for exhibition for the first time. Surplus specimens were immediately exchanged with other zoos.

On this trip the party was assisted greatly by His Excellency Sir Edward Denham, the Governor of British Guiana; Messrs. Henderson and Rucker, of the Bauxite Co., of British Guiana; Dr. George Giglioli, himself an ardent naturalist, who presented some of his pets to the expedition; and F. M. Walcott, of Hope Estate, who gave an ocelot.

While no Surinam toads were obtained on this trip, arrangements were made which later resulted in the receipt of 90 specimens in good condition, through the kindness of Captain Lum, of the Munson Steamship Line, who brought them to New York from Paramaribo. This placed on exhibition a large group of this rare toad, and enabled us to exchange specimens for exhibition with other zoos.

DONORS AND THEIR GIFTS

Stuart Abraham, Braddock Heights, Md., copperhead.

Roy Adams, Washington, D. C., snapping turtle.

Mrs. M. W. Arps, Washington, D. C., ring-necked dove.

Vincent Astor, New York City, two Galapagos iguanas.

Charles A. Baker, 2d, Baltimore, Md., kinkajou.

Dr. Paul Bartsch, United States National Museum, Washington, D. C., Jamaican snail.

F. H. Benjamin, United States Plant Quarantine and Control Administration, Orlando, Fla., Florida cooter, Osceola snapping turtle, two Florida box turtles.

Robert L. Bieber, Potomac, Md., goat.

J. B. Bland, Washington, D. C., alligator.

Miss Blondell, Washington, D. C., tarantula.

Mr. and Mrs. J. S. C. Boswell, Alexandria, Va., California king snake, three Boyle's king snakes.

M. K. Brady, Washington, D. C., king or chain snake, 2 common fence lizards, 2 blue-tailed skinks, marbled salamander, 12 Stejneger's anolis.

C. J. Brahm, Philadelphia, Pa., Chinese mantis.

Messrs. E. J. and S. K. Brown, Eustis, Fla., coral snake, scarlet snake, water snake, two corn snakes, hog-nosed snake, chicken snake, two Florida king snakes.

Meredith and Walker Buel, Washington, D. C., common fence lizard.

Allen M. Burdett, Washington, D. C., two alligators.

C. R. Burnett, Richmond, Va., white-fronted parrot, yellow-fronted parrot.

Dr. Charles E. Burt, Southwestern College, Winfield, Kans., three slender burrowing snakes, two western ring-necked snakes, brown skink, two collared lizards, two blacksnakes, five ornate tortoises, western or blue racer.

F. G. Carnochan, New York City, canvasback duck, two mallard ducks.

R. R. Carpenter, Wilmington, Del., curl-tail lizard.

Bernard Cawill, Silver Spring, Md., two coyotes.

Kenneth Clow, Washington, D. C., capuchin monkey.

Miss Doris M. Cochran, United States National Museum, Washington, D. C., 2 scorpions, 22 water snakes.

Mrs. R. Cohen, Bowie, Md., three angora goats.

Dr. F. V. Coville, United States Bureau of Plant Industry, Washington, D. C., seven chuckwallas.

Mrs. Annie T. Craley, Washington, D. C., yellow-fronted parrot.

Miss Amelia Crawford, Washington, D. C., alligator.

Mrs. J. H. Cummings, Wilmington, N. C., two glass snakes, six-lined lizard, anolis.

R. O. E. Davis, Washington, D. C., barred owl.

Allen DeFord, Washington, D. C., alligator.

Charles F. Denley, Rockville, Md., four golden pheasants.

Miss Grace Devendorf, Washington, D. C., mynah.

F. I. Donn, Washington, D. C., common gallinule.

M. C. Dowling, Bethesda, Md., 11 horned lizards.

Mrs. Bertha Duncan, Washington, D. C., red fox.

E. W. Ehmann, Piedmont, Fla., six baldpates, six pintail ducks.

Dr. Wm. O. Emery, United States Bureau of Chemistry and Soils, Washington, D. C., three blind worms.

Mrs. C. L. Emmart, Baltimore, Md., alligator.

F. W. Engle, Washington, D. C., common boa.

William Engle, Washington, D. C., canary.

I. B. Faidley, Falls Church, Va., coot.

Dr. David Fairchild, Washington, D. C., two hermit crabs.

Mrs. R. W. Ferguson, Fernandino, Fla., two Florida skunks.

F. T. Fitch, Buchanan, Va., duck hawk.

H. J. Gibson, Washington, D. C., blacksnake.

Dr. George Giglioli, Mackenzie, British Guiana, deer, curassow.

Norman Gilillan, Washington, D. C., hog-nosed snake.

Mrs. Goodloe, Washington, D. C., opossum.

Alex Goodman, Washington, D. C., woodchuck.

R. H. Gordon, Washington, D. C., horned lizard.

W. B. Grange, United States Bureau of Biological Survey, Agassiz's tortoise, three horned lizards, spiny swift, spiny-tailed lizard.

Miss Hawthorne, Washington, D. C., sparrow hawk.

Miss L. E. Hemington, Washington, D. C., six canaries.

Horace Hicks, Washington, D. C., DeKay's snake.

James P. Holloway, Washington, D. C., rhesus monkey.

C. H. Holmes, Washington, D. C., red-tailed hawk.

R. Bruce Horsfall, Nature Magazine, Washington, D. C., corn snake.

S. R. Hughes, Leesburg, Va., common loon.

Mr. and Mrs. Martin Johnson, New York City, chimpanzee, mountain gorilla.

Walter Johnson, Bethesda, Md., silver pheasant, golden pheasant, two lineated pheasants.

D. C. Jonhas, Washington, D. C., box tortoise, garter snake, common anolis.

E. S. Joseph, New York City, lung fish.

Mr. Keith, Georgetown, S. C., 5 water moccasins, 2 blacksnakes, 2 water snakes, 3 copperheads, chicken snake, king or chain snake.

C. O. King, Washington, D. C., tarantula.

John Kitterman, Kensington, Md., two common terns.

B. P. Klibas, Washington, D. C., hawks-bill turtle.

R. F. Knox, Cherrydale, Va., banded rattlesnake.

Sam Kress, Port Limon, Costa Rica, jabiru, collared peccary.

James LaFontaine, Washington, D. C., great horned owl.

Miss Catherine Larner, Whitehall, N. Y., brown capuchin.

S. E. Laurell, Washington, D. C., patas monkey.

Mrs. F. C. Lincoln, Takoma Park, Md., opossum.

Mrs. John Linder, Washington, D. C., two alligators.

Robert Locke, Washington, D. C., alligator.

Thomas H. Loyd, jr., Washington, D. C., West Indian tree frog.

John L. Lucas, Washington, D. C., kangaroo rat.

John C. Lyddams, Washington, D. C., alligator.

Van Allen Lyman, Washington, D. C., scorpion.

Mrs. J. R. Malloch, Ballston, Va., raccoon.

G. Manos, Washington, D. C., four opossums.

George E. Mattingly, Washington, D. C., pied-billed grebe.

E. A. McIlhenny, Avery Island, La., 2 anhingas, 4 snowy egrets, 2 Louisiana herons.

Kenneth Meyers, Takoma Park, Md., common skink.

G. S. Miller, jr., United States National Museum, Washington, D. C., four Puerto Rican snails.

James Miller, Washington, D. C., mink.

Mrs. Rose L. Miller, Washington, D. C., ferret.

W. W. Minear, Quincy, Ill., 14 blacksnakes, 19 water snakes, 8 garter snakes, 8 banded rattlesnakes, 4 leopard snakes.

Dewey Moore, United States Bureau of Plant Industry, Indio, Calif., 2 giant hairy scorpions, sidewinder rattlesnake, 2 desert rattlesnakes, California bullsnake, 3 lizards, 4 scorpions.

Dr. G. K. Noble, American Museum of Natural History, New York City, two southern ctenosaurs.

Dr. H. C. Oberholser, United States Bureau of Biological Survey, Washington, D. C., two whistling swans.

William O'Brien, Washington, D. C., double yellow-head parrot.

Dr. S. Logan Owens, Washington, D. C., two yellow-naped parrots.

Mrs. A. N. Pack, Princeton, N. J., raccoon.

J. R. Page, jr., Greensboro, N. C., Florida diamond-back rattlesnake.

Axel Pedersen, Washington, D. C., woodchuck.

S. F. Perkins, Washington, D. C., two king snakes, water snake, blacksnake.

A. L. Pflueger, North Miami, Fla., two diamond-back turtles, four Florida box turtles.

Philadelphia Zoological Park, Philadelphia, Pa., three soft-shell turtles.

Polly's Tea Room, Alexandria, Va., two raccoons, skunk, ocelot, collared peccary, great horned owl, three barred owls, crab-eating macaque, African gray parrot.

Carlos Quiros, Port Limon, Costa Rica, emperor boa.

Michael Rainey, Washington, D. C., alligator.

Donald Reder, Lorton, Va., mink.

Miss M. E. Rice, Washington, D. C., woodchuck.

A. G. Richardson, Salem, Mass., two alligators.

Mrs. Riley, Washington, D. C., flicker.

H. H. Rudolph, Washington, D. C., 20 bob-whites.

W. K. Ryan, Washington, D. C., four *Fundulus galaris*.

San Diego Zoo, San Diego, Calif., four farallone cormorants.

William Sanders, Washington, D. C., yellow-naped parrot.

Dr. J. E. Schillinger, United States Bureau of Biological Survey, Washington, D. C., two whistling swans.

Mrs. I. D. Schwartz, Washington, D. C., alligator.

Mrs. Shelby, Benning, D. C., two coyotes.

R. D. Shields, Silver Springs, Md., capuchin monkey.

Miss Betty Shorey, Washington, D. C., tarantula.

Eugene Sibley, Chevy Chase, Md., two Peking ducks.

S. G. Sifalla, Washington, D. C., Sumichrast's deer mouse and young.

Mrs. W. H. Smith, Washington, D. C., canary.

C. C. Sperry, United States Bureau of Biological Survey, Washington, D. C., two collared lizards.

R. E. Stadelman, Tela Serpentarium, Tela, Honduras, white-lipped peccary, prehensile tailed-porcupine, two coral snakes, six jumping vipers.

B. F. Stepper, Washington, D. C., 2 skinks, blue-tailed skink, 19 fence lizards, 2 red toads.

H. G. Stewart, Seabrook, Md., spotted salamander.

Hon. Henry L. Stimson, Washington, D. C., great red-crested cockatoo.

Shreve Stombach, red-tailed hawk.

J. Ralph Taylor, Washington, D. C., copperhead snake.

Richard Taylor, Middleburg, Va., horned lizard.

Elaine and South Trimble, Washington, D. C., flying squirrel.

United States Bureau of Biological Survey, Department of Agriculture, Washington, D. C., laughing gull.

United States Post Office, Dead Letter Section, alligator.

Mrs. Elizabeth Voegele, Martinsburg, W. Va., orange-winged parrot.

Walker Chevrolet Sales Co., Tazewell, Va., two golden eagles.

W. Paul Ward, Fairmont, W. Va., Cooper's hawk.

Charles Williams, marine turtle.

G. E. Williams, Washington, D. C., red salamander.

Larry Williams, Chevy Chase, Md., spotted salamander.

Miss Mary Wills, Washington, D. C., horned lizard.

G. W. Wilson, Washington, D. C., Florida gallinule.

Paul Winthrop and C. W. Buckley, Washington, D. C., hog-nosed snake.

Maj. Leigh F. Zerbee, United States Army, coral snake, Panama fresh-water fish.

Donor unknown, two canaries.

Births.—There were 41 mammals born, 62 birds hatched, and 45 reptiles hatched or born in the Park during the year. These include the following:

MAMMALS

Scientific name	Common name	Number
Æpyprymnus rufescens	Rat kangaroo	1
Axis axis	Axis deer	2
Bison bison	American bison	1
Canis nubilus	Plains wolf	3
Cervus canadensis	American elk	1
Cervus duvaucellii	Barasingha deer	1
Cervus elaphus	Red deer	2
Choeropsis liberiensis	Pigmy hippopotamus	1
Dama dama	Fallow deer	2
Equus quagga chapmani	Chapman's zebra	1
Felis leo	Lion	3
Myocastor coypu	Coypu	3
Odocoileus hemionus	Mule deer	2
Odocoileus virginianus	Virginia deer	2
Ovis canadensis	Rocky Mountain sheep	2
Ovis europaeus	Mouflon	2
Phacochoerus aethiopicus massaicus	East African wart hog	5
Poephagus grunniens	Yak	1
Rusa moluccensis	Molucca deer	1
Sika nippon	Japanese deer	3
Ursus gyas	Alaska Peninsula brown bear	1
Zalophus californianus	California sea lion	1

BIRDS

Scientific name	Common name	Number
Anas platyrhynchos	Mallard duck	5
Branta canadensis subsp	Canada goose group	17
Larus novaehollandiae	Silver gull	22
Nycticorax nycticorax naevius	Black-crowned night heron	18

REPTILES

Scientific name	Common name	Number
Bothrops lanceolatus	Fer-de-lance	15
Crotaphytus collaris	Collared lizard	6
Epicrates angulifer	Cuban tree boa	3
Eunectes murinus	Anaconda	6
Natrix sp	Water snake	15

Purchases.—The most important purchases during the year were two Cape hunting dogs, two fine Aldabra tortoises, and a pair of giant anteaters.

REMOVALS

Causes of death.—When it has been thought that determination of the cause of death of certain animals might be useful, the specimens have been submitted to the pathological division of the Bureau of Animal Industry for examination. The following list shows the results of the autopsies:

MAMMALS

Artiodactyla: Congestion of the lungs, 1.
Primates: Purulent peritonitis, 1; pneumonia, 1.

BIRDS

Columbiformes: Catarrhal enteritis, 1.

The great loss of the year was the death of N'Gi, a 4½-year-old baby gorilla that had been in the Zoo from December 5, 1928, to March 10, 1932. He became ill with a bad cold, which progressed into pneumonia complicated with empyema. Dr. D. E. Buckingham, veterinarian, and his assistant, were called immediately and stayed with him day and night throughout his illness. Dr. John C. Eckhardt, M. D., a great friend of the Zoo, served as a volunteer consultant.

Through the kind interest and generosity of Mrs. Eleanor Patterson, of the Washington Herald, several X-ray pictures were made and an oxygen chamber with technicians and full equipment was brought from New York by airplane and N'Gi placed in this in an effort to save his life. He recovered somewhat, but because of the empyema a surgical operation was necessary. This was performed gratuitously by Dr. Charles Stanley White, of Washington, but the long illness had so weakened the monkey that he died shortly afterwards.

At the time N'Gi was ill, Jojo, the chimpanzee in the adjoining cage, also became ill and died. Both deaths were apparently occasioned by the same type of ailment, generally called the flu or grip, which was prevalent in Washington at that time.

Okero, the mountain gorilla, and his cage mate, Teddy, the chimpanzee, developed a slight pneumonia, but soon recovered.

ANIMALS IN COLLECTION THAT HAD NOT PREVIOUSLY BEEN EXHIBITED

MAMMALS

Scientific name	Common name
Cacajou calvus	White Uakari monkey.
Chiroptes chiroptes	Cuxio monkey.
Euphractus sexcinctus	Six-banded armadillo.
Lycaon pictus	Cape hunting dog.
Metachirus fuscogriseus	Allen's mouse opossum.
Nyctomys sumichrasti	Sumicharast's deer mouse.
Sciurus humei	Tricolored squirrel.

BIRDS

Scientific name	Common name
Pitangus sulphuratus	Kiskadee flycatcher.
Psomocolax oryzivora	Rice grackle.
Sporophila lineola	White-crowned seed-eater.
Tinamus major	Guiana giant tinamou.

REPTILES

Scientific name	Common name
Ameiva ameiva ameiva	South American swift.
Anilius scytale	Blunt-tailed anilius.
Anolis leucophaeus	Turks Island anolis.
Crocodilurus lacertinus	Crocodile lizard.
Erpetodryas carinatus	Marsh snake.
Erpetodryas fuscus	Red and black snake.
Erythrolamprus aesculapii	False coral snake.
Helicops angulata	South American water snake.
Leiocephalus inaguae	Inagua Island curl-tail lizard.
Leiocephalus sp	Curl-tail lizard (Andros Island).
Leptophis ahaetulla	Parrot snake.
Petalognathus nebulatus	Blunt-head snake.
Philodryus viridissimus	Green tree snake.
Phrynona sulphureus	South American rat snake.
Phrynosoma solare	Crowned horned lizard.
Plica plica	Plicated lizard.
Podocnemis expansa	South American river tortoise.
Polychrus marmoratus	Marbled lizard.
Pseudoboa cloelia	Mussurana.
Python curtus	Blood python.
Spilotes pullatus pullatus	Tiger snake.
Tantilla coronata	Banded burrowing snake.
Testudo elephantina	Elephant tortoise.
Thecadactylus rapicaudus	Gecko.
Xenodon severus	South American puff snake.

AMPHIBIANS

Scientific name	Common name
Gyrinophilus porphyriticus	Purple salamander.
Hyla septentrionalis	West Indian tree frog.
Pipa americana	Surinam toad.

FISHES

Scientific name	Common name
Elecrophorus electricus	Electric eel.
Lepidosiren paradoxa	South American lung fish.

INSECTS

Scientific name	Common name
Tenodera sinensis	Chinese mantis.

MOLLUSKS

Scientific name	Common name
Oxystyla undata	Puerto Rican snail.
Oxystyla undata jamaicensis	Jamaican snail.

Statement of the collection

[Accessions]

	Collected by park expedition	Presented	Born	Received in exchange	Purchased	On deposit	Total
Mammals	19	57	41		32	4	153
Birds	105	101	62	1	37	3	309
Reptiles	160	209	45	43	110	3	570
Amphibians	33	3			122		158
Fishes		2		1	2		5
Arachnids		10					10
Insects		3					3
Crustaceans		2					2
Mollusks		5			2		7
Total	317	392	148	45	305	10	1,217

Summary

Animals on hand July 1, 1931	2,501
Accessions during the year	1,217
Total animals in collection during year	3,718
Removed from collection by death, exchange, and return of animals on deposit	1,416
In collection June 30, 1932	2,302

Status of collection

	Species	Individuals		Species	Individuals
Mammals	194	530	Arachnids	3	4
Birds	328	1,031	Crustaceans	1	3
Reptiles	157	549	Mollusks	2	27
Amphibians	28	101			
Fishes	15	57	Total	728	2,302

Visitors

July	202,100	March	174,585
August	216,200	April	252,000
September	262,400	May	272,300
October	241,750	June	175,200
November	161,900		
December	48,825	Total visitors for year	2,169,460
January	65,800		
February	96,400		

The attendance of organizations, mainly classes of students, of which we have definite record, was 36,318 from 716 different schools in 22 States, the District of Columbia, and Cuba, as follows:

States	Number of persons	Number of parties	States	Number of persons	Number of parties
Alabama	24	1	New York	3,482	43
Connecticut	203	4	North Carolina	292	11
Delaware	218	9	Ohio	453	16
District of Columbia	10,012	202	Pennsylvania	7,494	153
Florida	75	3	Rhode Island	97	3
Illinois	65	2	South Carolina	31	1
Iowa	188	2	Tennessee	30	1
Kentucky	65	2	Virginia	1,995	48
Maine	188	6	West Virginia	214	6
Maryland	7,626	132			
Massachusetts	310	9	Cuba	14	1
Michigan	430	8			
New Hampshire	55	3	Total	36,318	716
New Jersey	2,757	50			

IMPROVEMENTS

The largest improvement of the year was the construction of approximately 11,000 feet of chain-link fence to inclose the park, taking the place of a fence that had been in use for about 31 years. In connection with the fence installation stone gate pillars and electric-welded gates were installed, and the street paving at the various entrances was adjusted in conformity with the new gates.

A series of crane runs were constructed immediately east of the bird house. The wire used was an aluminum alloy, and the installation is of an experimental nature to determine if such material will be satisfactory for this type of inclosure. Adjoining the crane runs have been built a series of nine pens for pheasants. The wire in this case was a small-diameter copper weld, which is also partly in the nature of an experiment.

The wild-horse group has been accommodated by the construction of a series of paddocks and shelter houses on filled-in land off the main road, which now house the zebras, the kiang, and Mongolian wild horses.

The eagle cage, which had been in course of construction for some time, was completed early in the spring of 1932, and birds were immediately placed in it. Artificial rockwork forms an attractive background, and the cage as a whole is very satisfactory.

A series of outdoor cages for ostriches, rheas, emus, and cassowaries were begun and nearly completed at the end of the fiscal year. These are on the new fill back of the bird house, and will permit a much better exhibition of these large and interesting birds than has heretofore been possible. The new cages are located with due respect to the anticipated addition on the south of the bird house, so that the entire assembly will have a pleasing appearance when completed.

The Bureau of Standards, Bureau of Agricultural Engineering, and Bureau of Public Roads are assisting in determining the best material for floors for cages, and corrosion-resistant metals for cages and paddocks.

Heretofore the American waterfowl pond has been provided with water taken directly from the creek, which made the pool muddy and insanitary. In addition, the dam which raised the water in the creek sufficiently to take it into the pond resulted in a large accumulation of silt, filling the bed of the stream up to the upper ford in the Zoo, so that the ford could be used only part of the time by motorists. This combination of circumstances made it advisable to pipe city water into the duck pond, and the dam has been torn out of the creek. The water is turned on only during the night. This has resulted in a clean pool and in improvement of the conditions of the creek bed and the ford.

The Beatrice Henderson cage for birds was rewired and is now accommodating a colorful exhibit of macaws and cockatoos.

R. Bruce Horsfall, staff artist of Nature Magazine, has contributed to the Zoo two beautiful panoramas which he painted in the reptile house. One of these shows a Galapagos Island scene with Indefatigable Island in the distance, and makes a splendid background for the collection of tortoises. The other is a Komodo Island landscape on the wall of the cage now occupied by an assortment of large lizards. These paintings add greatly to the building's attractiveness.

NEEDS OF THE ZOO

The older buildings of temporary construction are obsolete and unsatisfactory. The urgent need of the Zoo is to continue the construction of exhibition buildings similar to the bird house and reptile house, both of which are entirely satisfactory.

Funds were provided in the last appropriation for plans and specifications for a building to house small mammals and great apes. Considerable work has been done on these plans.

The reptile house continues to be the most popular building at the Zoo, and proves that it is worth while from all points of view to exhibit animals suitably.

The police force is too small to guard the Government property for which it is responsible. An adequate force is needed.

Respectfully submitted.

W. M. MANN, *Director.*

DR. C. G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 7

REPORT ON THE ASTROPHYSICAL OBSERVATORY

SIR: I have the honor to submit the following report on the activities of the Astrophysical Observatory for the fiscal year ended June 30, 1932:

PLANT AND OBJECTS

This observatory operates regularly the central station at Washington and two field stations for observing solar radiation on Table Mountain, Calif., and Mount Montezuma, Chile. The station at Mount Brukkaros, Southwest Africa, which was established by the National Geographic Society and was continued for a time in cooperation with the Astrophysical Observatory with funds donated by a friend of the Institution, was closed in December, 1931.[1] The observatory controls a station on Mount Wilson, Calif., where occasional expeditions are sent for special investigations, one of which is mentioned below.

The principal aim of the observatory is the exact measurement of the intensity of the radiation of the sun as it is at mean solar distance outside the earth's atmosphere. This is ordinarily called the solar constant of radiation, but the observations of past years by this observatory have proved it variable. As all life, as well as the weather, depends on solar radiation, the observatory has undertaken the continued measurement of solar variation on all available days. These measurements have now continued all the year round for 14 years. As will appear in this report, recent studies indicate that the permanent continuation of these daily solar-radiation measurements may have great value for weather forecasting. In addition to this principal object, the observatory undertakes spectroscopic researches on radiation and absorption of atmospheric constituents, radiation of special substances, such as water vapor, ozone, carbonic-acid gas, liquid water, and others, and the radiation of the other stars as well as of the sun.

WORK IN WASHINGTON

Volume V of the Annals of the Observatory was printed and distributed in the autumn of 1931. It rehearses the annals of the work from 1920 to 1930; describes the stations and instruments employed;

[1] The valuable collections of zoological and botanical specimens made in Southwest Africa by Mrs. L. O. Sordahl, wife of the director, and brought back to Washington with the instruments, are referred to above in the report of the National Museum.

discusses the sources of error inherent in the use of the bolometer, the pyranometer, and the pyrheliometer, and their application to solar-constant determinations. It explains the methods now in use at the several stations for measuring solar radiation; gives long tables of pyrheliometry and results of bolometry, pyrheliometry, and pyranometry combined in daily determinations of the solar constant. Finally, it gives a discussion of the results of all stations for the interval 1920–1930. The agreement of the stations, the best results on the variability of the sun, and the apparent periodicities in solar variation, and their reflection in weather changes are set forth.

As delegate from the Smithsonian Institution, Doctor Abbot attended the Geographical Congress at Paris and the one hundredth anniversary meeting of the British Association for the Advancement of Science, the Faraday celebration, and the Maxwell celebration in London and Cambridge. He delivered a paper before the British Association entitled " Twenty-five Years' Study of Solar Variation."

At the conclusion of the meetings he went to Berlin, and with Doctor Martens at Potsdam he made an accurate comparison between silver-disk pyrheliometers S. I. 5_{bis}, carried abroad with him, and S. I. 12, the property since 1912 of the meteorological observatory at Potsdam. Apparently no appreciable change of scale in the readings of pyrheliometer S. I. 12 has occurred in the intervening 19 years. This result, confirming the stability of scale of the Smithsonian silver-disk pyrheliometers, is very gratifying.

Owing to long-continued illness, Mr. Fowle's work was practically confined to the preparation for publication of a new edition of the Smithsonian Physical Tables.

Messrs. Aldrich and Kramer spent much time on instruments for pyrheliometry. After long-continued efforts to perfect a new form of secondary pyrheliometer of much promise, the instrument was laid aside for a time. Following the suggestion of the Russian physicist, V. M. Shulgin, a new 3-chamber water-flow pyrheliometer was put in construction. The instrument comprises two pyrheliometers, each nearly like that described in the Annals of the Astrophysical Observatory, Volume III, page 52. A common current of distilled water, carefully guarded against temperature changes, divides into two nearly equal branches to operate the two instruments. Solar heating in the one is compensated by electrical heating in the other, interchanging the two instruments at intervals of two minutes. The measurement consists only in adjusting and observing the required electric current to exactly compensate the solar heating, so that the two water currents issue at exactly equal temperatures. Equality of their temperatures is indicated by eight thermoelectric elements connected in series with their junctions alternately immersed in the two issuing water currents.

This instrument, called water-flow pyrheliometer No. 5, was finished in May, 1932. Immediately afterwards Messrs. Aldrich and Kramer constructed a doubly dispersing spectroscope designed to observe the extreme infra-red solar spectrum between wave lengths 10 and 30 microns. This is the spectral region wherein the earth emits radiation most strongly. As the sun rays come through the atmosphere much as the earth rays pass out through it, the instrument was intended to measure accurately the transmission of the atmosphere to earth rays, a subject fundamental to meteorology.

A large diffraction grating of 25 lines per millimeter was very kindly ruled for this instrument by Dr. H. D. Babcock, of the Mount Wilson Observatory, by cooperation of Director W. S. Adams. A potassium-iodide prism for the second dispersion was kindly loaned by the University of Michigan. The instrument was completed about June 1, 1932, and shipped to Mount Wilson, Calif.

Mrs. A. M. Bond and Doctor Abbot did a great deal of work on the investigation of periodicities in solar and terrestrial phenomena by the aid of the periodometer, referred to in last year's report. Several papers descriptive of this work will be found in Smithsonian Miscellaneous Collections, volume 85, No. 1, and volume 87, Nos. 4 and 9.

FIELD WORK AT MOUNT WILSON

Messrs. Abbot and Aldrich left Washington about June 4, 1932, to conduct experiments on Mount Wilson. They obtained excellent comparisons between water-flow pyrheliometer No. 5 and silver-disk pyrheliometer S. I. 5_{bis} during June. These results, it is believed, fix the standard scale of solar radiation to within 0.2 per cent. The expedition was continued through the summer. Its results will be described in next year's report.

FIELD WORK AT MONTEZUMA, CHILE, AND TABLE MOUNTAIN, CALIF.

Daily observations of the solar constant of radiation were continued at the two permanent field stations. Unfortunately a great volcanic eruption in southern Chile rendered the atmosphere at Montezuma very hazy. This has prevented obtaining satisfactory measurements of the solar constant since April, 1932, and the daily reports to the United States Weather Bureau and to Science Service were therefore discontinued.

A. F. MOORE'S EXPEDITION

As stated in last year's report, Mr. and Mrs. A. F. Moore have been engaged in testing the availability of certain high mountains in Africa as solar-constant stations. Their observations at Fogo in

the Cape Verde Islands and on some half dozen peaks in Southwest Africa revealed nothing sufficiently favorable. All of these stations were too much affected by high-lying haze in the atmosphere to be satisfactory. From Southwest Africa Mr. and Mrs. Moore went to Mount St. Katherine, in the Sinai Peninsula in Egypt. With the good will and much aid from the archbishop and monks of the monastery near by, Mr. and Mrs. Moore carried on observations for about 100 days in April, May, June, and July, 1932, at the peak, whose elevation is about 8,600 feet. The results are the most favorable they found anywhere. About half the days are reported as excellent or satisfactory, the remainder as hazy or cloudy. Inquiries indicate that the other parts of the year will be still more favorable. Mr. Moore believes that many of the hazy days might have yielded good solar-constant values, for the haze changes but slowly, owing to the extraordinarily calm conditions which prevail on Mount St. Katherine continually.

PERSONNEL

At Washington, in compliance with the President's wishes to make all possible curtailment of expenditures in view of the growing deficit in the Treasury, the force was reduced by releasing Mrs. Muriel D. Johnson, computer, after the completion of Volume V of the Annals. L. O. Sordahl, formerly in charge of the Mount Brukkaros station and who had rendered able service in that connection, was released because of the discontinuance of that observatory as of June 30, 1932. No other changes occurred at any of the stations.

SUMMARY

Volume V of the Annals of the Observatory, covering work of the years 1920–1930, has been published. New instruments and results bearing on standards of pyrheliometry have been completed. Solar-constant work was discontinued in Southwest Africa, but continued at the Californian and Chilean stations. The volcanic eruption in southern Chile led to a temporary suspension of publication of daily solar-constant values. Much work was done with the periodometer, a special instrument devised to discover and evaluate periodicities in long series of observations. Mr. and Mrs. Moore continued an expedition in Africa to discover a suitable mountain site for a solar-constant observatory. The most favorable site discovered is Mount St. Katherine in the Sinai Peninsula in Egypt.

C. G. Abbot, *Director.*

The Secretary,
Smithsonian Institution.

APPENDIX 8

REPORT ON THE DIVISION OF RADIATION AND ORGANISMS

SIR: I have the honor to submit the following report on the activities of the Division of Radiation and Organisms during its third year, ending June 30, 1932:

FACILITIES, SUPPORT, AND OPERATIONS

This division occupies as laboratories a large part of the basement of the original Smithsonian Building, extending from about the northern line of the towers westward but not including the space under the chapel. Besides these quarters, it occupies offices in the north tower from the fifth to the eleventh stories.

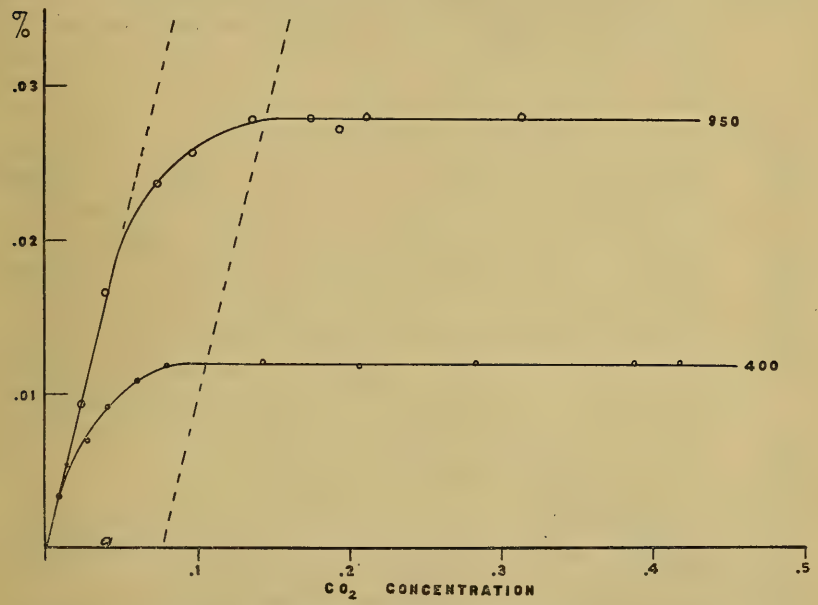
The work of the division is supported in part by the income of the Smithsonian endowment, but largely by annual grants from the Research Corporation of New York, to whom our sincere thanks are due. Besides this aid, cooperative relations exist with the United States Department of Agriculture, and through Doctor Meier, a fellow, with the National Research Council. Several commercial concerns, including the Corning Glass Works, the Bausch & Lomb Optical Co., the Westinghouse Electric Co., and the General Electric Co., have been very helpful.

The chief emphasis during the past year has been upon actual experimental work in biophysics. A number of the experiments which were reported as in progress at the end of 1931 have been carried to successful completion, with interesting results. Whereas the first year was largely devoted to building and equipping a laboratory in the basement of the Smithsonian Institution and the second year to the development of special apparatus for the unusual type of research to be undertaken, the past year has found these undertakings progressed to such a degree that efficient experimental work was possible. Initial experiments have been carried out which lay the foundation for continued investigations which we believe will prove valuable.

PHOTOSYNTHESIS

The carbon dioxide assimilated by wheat has been measured for light intensities varying from 78 to 1,900 foot-candles and for carbon-dioxide concentrations varying from 0.004 to 0.500 per cent. The

wheat is grown in an all-vitreous tubular container illuminated symmetrically from four sides. The wheat is protected by a sheet of copper-sulphate solution which serves the double purpose of maintaining the temperature and absorbing the excessive infra-red from the artificial sources. Carbon-dioxide concentration was measured by means of a potassium-hydroxide conductivity cell. The chief difficulties in this type of measurement have arisen from the high temperature coefficient and the polarization of the conductivity cell. These have been overcome, respectively, by improved thermostating which holds the solutions to within less than one one-hundredth of



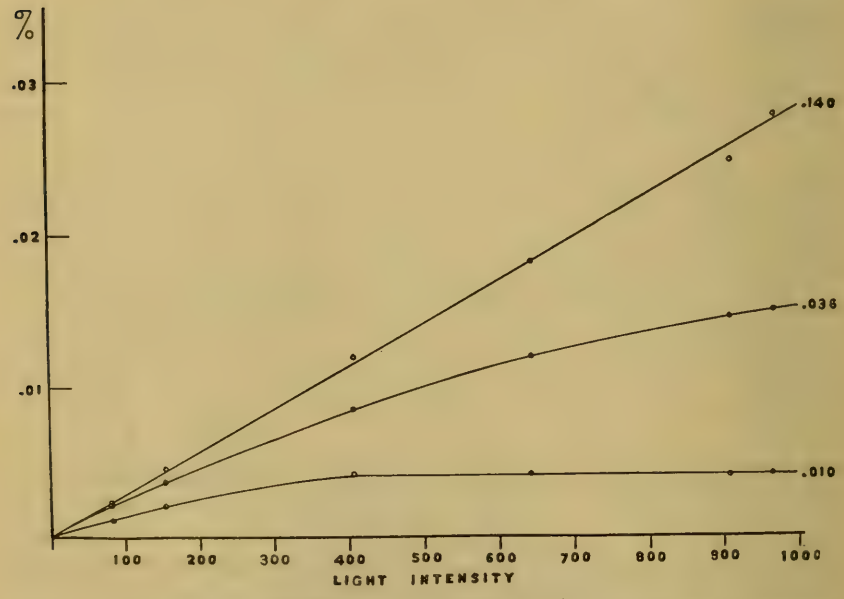
ASSIMILATION CURVES FOR WHEAT

FIGURE 1.—Assimilation as a function of concentration for light intensities 400 foot-candles and 950 foot-candles

a degree, and the installation of a commutator which reverses the polarity of the conductivity cell without changing the direction of the current through the galvanometer. By this method it has been possible to secure carbon-dioxide measurements which are significant to the order of one one-thousandth of a per cent. Typical curves of assimilation as a function of carbon-dioxide concentration are shown in Figure 1. Each of these curves represents the values for a single light intensity. For a light intensity of 950 foot-candles photosynthesis is proportional to the concentration of carbon dioxide from 0 to 0.04 per cent. A maximum rate is reached at a concentration of 0.140 per cent. Further increase in concentration up to one-half per cent produces no further change in assimilation, light intensity being the limiting factor for this range. At a lower light intensity

of 400 foot-candles departure from linear proportionality to concentration begins at a much lower value, of the order of 0.01 per cent, maximum being reached at approximately 0.10 per cent, after which no further change takes place in the range of experiment.

Referring to Figure 2 we see that for a carbon-dioxide concentration of 0.140 per cent the assimilation is proportional to the light intensity for the range from 0 to 1,000 foot-candles. On the other hand, for a concentration of 0.01 per cent a maximum is reached for light intensity of 400 foot-candles, after which further increase in light intensity produces no change, carbon dioxide being the limiting factor. It thus appears that carbon dioxide may be the limiting factor for sufficiently high light intensities, assimilation varying



ASSIMILATION CURVES FOR WHEAT

FIGURE 2.—Assimilation as a function of light intensity for carbon dioxide concentration 0.010, 0.036, 0.140 per cent

proportionally to the carbon-dioxide concentration over a considerable range. On the other hand, for sufficiently high carbon-dioxide concentrations the light intensity may become the limiting factor, assimilation being proportional to the light intensity. There exist, however, well-defined regions over which the assimilation is dependent upon both factors. In examining the significance of this transition range, however, it must be borne in mind that ideal conditions can not be secured. Not all the chloroplasts can be maintained in the same radiation density, nor can exactly the same concentration of carbon dioxide be brought in contact with all the surfaces of the leaves. Nevertheless, the apparatus has been so designed

as to minimize these difficulties. The fact that the sources of radiation are symmetrically placed on all four sides not only reduces the fluctuations of intensity as a function of direction, but, owing to the fact that the leaves are exposed from both sides, reduces to a minimum the variation of intensity through the leaf. A method of recirculation reduces the variation of concentration over the plant to about one-thirtieth part of the difference between the input and the output concentrations.

In view of these precautions it does not seem likely that the whole of this transition range can be accounted for by variations in the environment. It is beyond the scope of this report to enter upon a more critical and detailed discussion of these points and the wide literature bearing upon them. A number of considerations are of particular interest: First, that for an intensity of approximately one-tenth of maximum sunlight the carbon-dioxide concentration of air is the limiting factor. As one goes to lower light intensities, intensity becomes first partially limiting and then wholly limiting, so far as the actual conditions controlling the growth of higher plants are concerned. On the other hand, by the extrapolation of the linear portion of this curve for the range where carbon dioxide is the limiting factor, together with the addition of the value a for the transition range, one may arrive at the concentration of carbon dioxide which would be required to give a maximum assimilation for available light intensity. Assuming for such a noonday intensity 7 × our experimental condition of 950 foot-candles one obtains

$$7\times0.069+0.081=0.564 \text{ per cent.}$$

Such an increase in available carbon dioxide would yield an increased assimilation rate amounting at times to tenfold or more.

This experiment has been chiefly conducted by Mr. Hoover. Doctor Johnston has worked with him upon some of the physiological phases, and Doctor McAlister upon the light-intensity measurements.

PLANT GROWTH

A set of individual plant-growth chambers has been completed which enables one to make comparative observations upon the effects of different wave length distributions of light. The four chambers have been so constructed as to permit of both lateral and overhead illumination. They are controlled by a central circulating system which maintains the same temperature and humidity in the four chambers. Rate of recirculation is maintained constant by flow meters. The same nutrient solution is used throughout. With this complete control of environment one can be assured of the significance of growth effects arising from modifications in light conditions alone.

A first experiment has been conducted by Doctor Johnston with this equipment, which indicates that an excessive intensity in the less refrangible end of the spectrum, that is, the infra-red and extreme red, is accountable for much of the abnormal appearance of plants grown in artificial light. Further experiments will be conducted which will indicate to what degree the long wave length end of the spectrum should be excluded. In the present experiment a portion of the red as well as the infra-red was cut off. Very likely this will not be necessary.

A set of color filters of unusually great diameter has been obtained through the cooperation of the Corning Glass Works. These present interesting possibilities for the investigation of the effects of light upon plant growth. Figure 3 shows the transmission characteristics which we have obtained from these filters. In this diagram transmission in per cent is plotted against wave length in microns. This group offers an opportunity to study the effects of

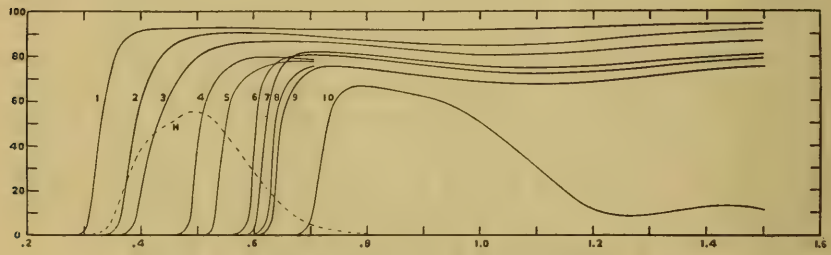


FIGURE 3.—Transmission curves of growth chamber filters

different portions of the visible light, since the range of wave lengths which may be supplied to the plants can be varied in convenient steps. The effects of photochemical reactions which may proceed only for wave lengths shorter than some specified value may be observed from the growth of plants under these various filters.

ALGAE

Dr. Florence Meier, National Research fellow, cooperating with Doctor McAlister of our laboratory, has conducted an interesting set of experiments on the lethal effects of the ultra-violet upon unicellular algae. This work has been made possible through the completion of a special combined spectrometer and self-recording monochromator. The instrument is of unusually great aperture as well as dispersive power. Two fused quartz prisms some 15 cm high, yield a large spread of the spectrum, which makes it possible to work with the relatively large slit widths required by the necessarily coarse-structured biological plates which are prepared by forming

a surface inoculation of algae upon agar. A special plate holder has been constructed which can be thoroughly sterilized in an autoclave, and which completely surrounds the algal plate even during exposure, thus insuring freedom from contamination. A thermocouple is driven across the spectrum and automatically records the intensities of the lines under the same conditions as those to which the algae have been exposed. The algal plates are then photographed and a densitometer record made just as one would with an ordinary photographic spectrum.

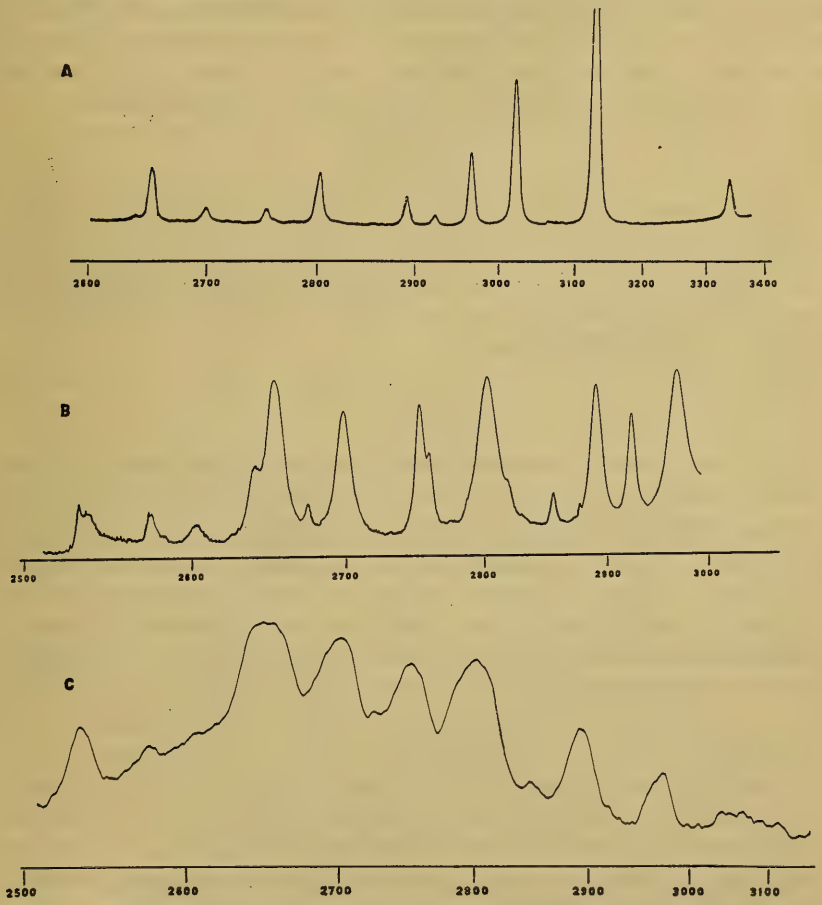


FIGURE 4.—Mercury arc spectrograms: A direct thermocouple record; B, microphotometer record of photograph; C, microphotometer record of algal plate

Figure 4 shows, first, the direct thermocouple record obtained automatically, curve A; second, the microphotometric record of a photographic spectrogram of the same general region, curve B; and third, such a microphotometric record of the algal plate, curve C.

PHOTOTROPISM

Phototropic investigations previously reported have been carried further into the blue end of the spectrum. It has been found that a maximum is reached at 4,500 A., the phototropic response dropping off rapidly then as one proceeds to 4,000 A. The results of the investigation at this stage were reported by Doctor Johnston to the American Society of Plant Physiologists at New Orleans in December of this year. Later experiments have indicated that departures from a simple curve, rising to a maximum and falling off again, are present. Further research is being carried on in order to determine whether fine structure may be present which would have an interesting bearing upon the theory of phototropism.

ULTRA-VIOLET

Ultra-violet measurements of the mercury arc with the double monochromator previously reported have been carried to the point where absolute intensities can be determined with reasonable certainty. The results of this investigation are in the process of publication by Doctor McAlister.

COOPERATION

Cooperative work with the Department of Agriculture has been greatly advanced by the appointment to their staff in the Bureau of Plant Industry, under Dr. Walter T. Swingle, of Dr. Lauriston T. Marshall. Doctor Marshall is working closely with this division upon their problems in determining the effects of radiation upon noncompetitive crop plants. Doctor Marshall is a physicist with special qualifications in the fields of photoelectricity and electrical conductivity through gases. The division has profited greatly by his association, as his experience supplements that of the physicists of the division, whose line of work has been chiefly in spectroscopic fields.

Continued cooperation with the Fixed Nitrogen Research Laboratory has made possible convenient exchange of facilities. Arrangements have been made with the Westinghouse Laboratories for the exchange of thermocouples and photocells, which will greatly facilitate our ultra-violet work.

Respectfully submitted.

F. S. Brackett, *Chief.*

Dr. C. G. Abbot,
Secretary, Smithsonian Institution.

APPENDIX 9

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE

SIR: I have the honor to submit the following report on the operations of the United States Regional Bureau of the International Catalogue of Scientific Literature for the fiscal year ending June 30, 1932:

In addition to the regular routine work of the bureau, direct correspondence with the former regional bureaus has been carried on in an attempt to resume the actual publication of this unique reference catalogue, whose absence is keenly felt alike by students of science and librarians. To this end the Secretary of the Smithsonian Institution addressed the following letter to 30 of the various bodies formerly cooperating in the work:

JANUARY 15, 1932.

DEAR SIR: Since publication of the International Catalogue of Scientific Literature was discontinued, its need both to students of science and libraries has become ever more pressing, and the Smithsonian Institution desires to do everything possible to promote reorganization of the enterprise. I am writing to ask whether your institution will again cooperate in the work by supplying classified references to the current scientific literature of your region if a sufficient capital fund can be provided to reestablish and finance the central bureau. If publication is to be resumed, aid from the regional bureaus formerly cooperating is essential to success; therefore I trust that your reply will be favorable, as it is obvious that the value of the work will depend on all regions being suitably represented.

I am inclosing with this a brief outline of the proposed organization plans, together with copies of three annual reports of this bureau containing matter relating to same subject.

Very truly yours,

(Signed) C. G. ABBOT, *Secretary.*

PROPOSED REORGANIZATION OF THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE

In 1922 the International Catalogue of Scientific Literature in convention at Brussels directed its executive committee to submit a plan for reorganization when international conditions had sufficiently improved. Since then, however, international political and financial conditions have been such that no reorganization plan has been forthcoming. The need for the catalogue is to-day greater than when publication ceased and nothing has appeared to take its place.

The organization, consisting of some 34 regional bureaus, cooperating through the Central Bureau in London, supplied classified-index references for the catalogue, and this method appears to have been ideal in accomplishing this the

most difficult phase of the work. Moved by the fixed desire to see this great work resumed, the Smithsonian Institution is now addressing the bodies formerly cooperating requesting assurances of renewed aid by supplying classified indexes to the scientific literature of their respective regions. The Institution has figures showing that a catalogue consisting of 10,000 pages, divided into 17 annual volumes, can be published to sell at a cost of $50 per year, provided 1,000 subscriptions can be had.

The situation is now far simpler than it was when the organization was founded in 1900, for then no precedent existed for such an international cooperative enterprise. Now the successful publication of 238 volumes aggregating some 140,000 pages of the International Catalogue is substantial and convincing proof that the original plan was feasible. War and disorganized international conditions alone were responsible for the necessity of suspending publication. Faults existed, but faults mainly brought about by lack of capital and a somewhat slow and expensive method of printing through private concerns. It is now proposed to remedy these defects through the ownership of a specially designed and equipped plant to print only the International Catalogue. By this means it is believed that the catalogue can be printed for approximately one-half the original cost and the two main defects formerly existing—high prices and delayed publication—be remedied.

It is apparent that in the proposed reorganization it is first necessary to obtain assurance from regional bureaus that the aid formerly given can be depended on again to supply classified references, as in this cooperation lay the outstanding and unique value of the whole project.

When such assurance is received the next step will be to solicit subscriptions to determine whether editions of 1,000 sets of 17 annual volumes can be sold in order to reduce the price to $50 per set.

With these essential requirements satisfactorily met and a concise plan of operations agreed to, it is hoped and expected that the necessary capital to resume publication, estimated at $75,000, can be obtained.

Operating details may well be based on the records and regulations of the organization as formerly carried out by the London Central Bureau.

Responses to these communications have been most gratifying and encouraging, as 16 of the 18 replies received from organizations addressed have agreed to cooperate again on the terms outlined. For various reasons, owing to social and political changes resulting from the war, successful contacts have not been made in a number of regions; but it is believed that when a definite plan has been agreed to among the bodies already cooperating, all regional gaps can be filled, as the importance of the work is so well recognized that no country or region could afford to be omitted.

Respectfully submitted.

Leonard C. Gunnell,
Assistant in Charge.

Dr. Charles G. Abbot,
Secretary, Smithsonian Institution.

APPENDIX 10

REPORT ON THE LIBRARY

SIR: I have the honor to submit the following report on the activities of the Smithsonian library for the fiscal year ended June 30, 1932:

THE LIBRARY

The library of the Smithsonian Institution is really a library system, for it comprises 45 distinct libraries, namely, the Smithsonian deposit in the Library of Congress, office library, Langley aeronautical library, radiation and organisms library, the libraries of the United States National Museum, Bureau of American Ethnology, Astrophysical Observatory, National Gallery of Art, Freer Gallery of Art, National Zoological Park, and the 35 sectional libraries of the National Museum, which are the daily tools of the curators and their assistants. The system contains somewhat more than 800,000 volumes, pamphlets, and charts, as well as many thousands of items still uncatalogued or awaiting completion.

THE STAFF

At the close of the calendar year Miss Kate Gallaher, under library assistant, after more than 50 years of faithful Government service, most of it in the Smithsonian library, was retired, and her place was filled by the promotion of Miss Virginia C. Whitney, minor library assistant. To the vacancy thus occasioned was appointed Bruce Middleton, a graduate of the University of Rochester, who had had several years of library and clerical experience in the Rochester public library and the United States Census Bureau. The services of Mrs. Grace A. Parler, in the library of the Freer Gallery of Art, were continued. The other temporary employees were Mrs. Daisy Cadle, Miss Frances Finch, Miss Alice Elizabeth Hill, Miss Margaret Link, and Miss Jennette Seiler.

EXCHANGE OF PUBLICATIONS

In the course of the last year the library received 24,651 packages of one or more publications each, most of them exchanges. Especially large sendings came from the Audubon Association of the Pacific, San Francisco; Gesellschaft für Erdkunde, Leipzig; Hiro-

shima University, Hiroshima; Institut d'Estudis Catalans, Barcelona; Landesmuseums-verein für Vorarlberg, Bregenz; Lingnan University, Canton; Magyar Aero Szövetseg, Budapest; Royal Anthropological Institute of Great Britain and Ireland, London; R. Università, Pavia; and Saalburgmuseum, Homburg vor der Höhe. Among the publications received were 5,340 dissertations, chiefly from foreign universities and technical schools.

The correspondence of the library, involving 2,836 letters, or 1,028 more than the previous year, had to do largely, as usual, with the exchange of publications. The number of items obtained to meet special needs in various libraries of the Institution was 4,133, or 543 more than in 1931, the greatest increase being shown in those received for the library of the National Museum, where a special effort was made to check the standard sets.

GIFTS

Three gifts were outstanding—namely, a set, in 45 volumes, of the Phra Tripitaka, recently translated from the Bali into Siamese by the Mahamongkut Academy, from His Majesty the King of Siam in honor of His Majesty the late King Phra Mongkut Klao and for the encouragement of orientalists in their studies of the eastern classics; a set, in 3 volumes, of the translation into Siamese of the Paramatthamanjusa Visuddhi Maggatika (Commentaries on the Visuddhi-Magga), from His Excellency Chao Phya Abbai Raja; and a copy of Cristoforo Colombo—Documenti & prove della sua appartenenza a Genova, presented by His Excellency Dino Grandi during his recent visit to Washington as Royal Italian Minister of Foreign Affairs. Two other very important gifts were a copy, in 3 volumes, of Mohenjo-Daro and the Indus Civilization, edited by Sir John Marshall, from the editor, and one of volumes 19 and 20, with portfolios of plates, of The North American Indian, by Edward S. Curtis, from Mrs. E. H. Harriman—to complete the Smithsonian set of this superb work. Still other gifts included the following: Birds of Tropical West Africa, volume 2, by David Armitage Bannerman, from the Crown Agents for the Colonies; The Crosses and Culture of Ireland, by A. Kingsley Porter, from the Metropolitan Museum of Art; Faraday and His Metallurgical Researches, by Sir Robert A. Hadfield, from Maj. Gen. George O. Squier; Illustrated Catalogues of the Gustave Dreyfus Collection (Reliefs and Plaquettes, Medals, Bronzes), 3 volumes, from Sir Joseph Duveen; Illustrations of Japanese Aquatic Plants and Animals, 2 volumes, by the Fisheries Society of Japan, from the society; An Introduction to the Literature of Vertebrate Zoology, edited by Casey A. Wood, from the Blacker Library of Zoölogy, McGill University; Les Oiseaux de

l'Indochine Française, by J. Delacour and P. Jabouille, from J. Delacour; and Problems in Modern Physics, by H. A. Lorentz, from Robert A. Millikan. The largest miscellaneous gifts were 31 publications from Miss Margaret Miller, 37 from Dr. Adam G. Bøving, 58 from the American Association of Museums, 70 from Mrs. Jean L. G. Ferris, 144 from the Library of Congress, 454 from Hamilton College, 615 from William Perry Hay, and 650 from the American Association for the Advancement of Science. Several hundred also came, as usual, from Mrs. Charles D. Walcott.

The members and associates of the Institution who gave publications to the library were as follows: Secretary Abbot, Assistant Secretary Wetmore, Dr. R. S. Bassler, Dr. Marcus Benjamin, A. N. Caudell, A. H. Clark, W. L. Corbin, Dr. Herbert Friedmann, Miss Kate Gallaher, A. H. Howell, Dr. Aleš Hrdlička, Neil M. Judd, Dr. W. R. Maxon, G. S. Miller, jr., C. W. Mitman, A. J. Olmsted, W. de C. Ravenel, J. H. Riley, and Dr. William Schaus. From the late Dr. Charles W. Richmond also were received 100 or more volumes and pamphlets, not a few of which were rare works on natural history.

THE SMITHSONIAN DEPOSIT

The Smithsonian deposit in the Library of Congress is the largest and most important member of the Smithsonian library system; it consists chiefly of the reports, transactions, and proceedings of learned societies and institutions, and of scientific and technical monographs and journals. The collection numbers considerably more than 500,000 volumes, pamphlets, and charts. It is shelved mainly in the Smithsonian and periodical divisions. During the year just closed the Institution added to the deposit 2,872 volumes, 11,712 parts of volumes, 2,883 pamphlets, and 180 charts—a total of 17,647 publications. These included 3,436 dissertations. They also included 2,445 publications which the Smithsonian library obtained by exchange in response to special requests from the Smithsonian, periodical, and order divisions of the Library of Congress. Several thousand documents of foreign governments were sent to the documents division of the Library.

NATIONAL MUSEUM LIBRARY

The library of the United States National Museum is one of the principal units in the Smithsonian library system. In its 2 major and 35 minor collections—chiefly on natural history and technology—there are 82,144 volumes and 109,962 pamphlets. The year just closed was one of unusual accomplishment. The accessions were 2,737 volumes and 833 pamphlets, a gain of 210 over the previous year. The number of periodicals entered was 9,025, or 226 more than in 1931. The cataloguing and recataloguing covered 2,236 volumes,

1,006 pamphlets, and 17 charts—an increase of 818 over the year before. The number of cards added to the catalogue was 12,055, or 862 more than in 1931; the number added to the Museum shelf lists, 1,244; and the number prepared for the union shelf list in the Smithsonian Building, 1,741. The items sent to the 35 sectional libraries numbered 5,726 volumes and parts. The number of volumes sent to the bindery was 1,480. The Smithsonian library obtained in exchange for the Museum 1,377 volumes and parts that were lacking in its sets, 287 more than in 1931. The loans during the year to the staff of the Smithsonian Institution and its branches totaled 9,096 publications, or 1,875 more than in 1931. Two-thirds of these were made at the loan desk in the Natural History Building and one-third at the recently established loan desk in the Arts and Industries Building. The number of publications borrowed from the Library of Congress was 2,662, and elsewhere 477; the number sent back to the Library of Congress was 2,800, and to other libraries 532. These figures show a considerable increase over those for 1931. Loans were made to many libraries in Washington and to some outside. The questions answered by the reference assistants were even more numerous and difficult than usual, some involving a great deal of research. Most came from the scientific staff and the public in general, but many from visiting scientists from various parts of the country. Increased attention was given by the catalogue division to the analysis of standard sets, with a view to making the catalogue as complete a key as possible to these publications.

The sectional libraries were somewhat changed during the year. Those of mechanical technology and mineral technology became that of engineering, those of American archeology and Old World archeology that of archeology, and a sectional library of agricultural history was begun. These libraries, now 35 in number, are as follows:

Administration.
Administrative assistant's office.
Agricultural history.
Anthropology.
Archeology.
Biology.
Birds.
Botany.
Echinoderms.
Editor's office.
Engineering.
Ethnology.
Fishes.
Foods.
Geology.
Graphic arts.
History.
Insects.
Invertebrate paleontology.
Mammals.
Marine invertebrates.
Medicine.
Minerals.
Mollusks.
Organic chemistry.
Paleobotany.
Photography.
Physical anthropology.
Property clerk's office.
Reptiles and batrachians.
Superintendent's office.
Taxidermy.
Textiles.
Vertebrate paleontology.
Wood technology.

OFFICE LIBRARY

The office library consists mainly of books of reference and sets of the publications of the Institution and its bureaus and of other learned institutions and societies. It also contains a collection of general literature, including files of semipopular magazines. To this library were added during the last year 132 volumes and 47 pamphlets. The assistants in charge entered 2,889 periodicals, prepared 477 cards for the catalogue, filed 1,938 shelf-list and catalogue cards, and loaned 3,070 publications. Besides members of the staff, there were 644 visitors, many of whom came for information about the activities and collections of the Institution.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY

The library of the Bureau of American Ethnology is made up largely of works on the archeology, history, customs, languages, and general culture of the early American peoples, notably the North American Indian. The library has 30,071 volumes and 16,867 pamphlets, together with thousands of unbound periodicals and numerous photographs, manuscripts, and Indian vocabularies. The additions during the year were 400 volumes and 150 pamphlets. The number of periodicals entered was 3,400; of cards prepared for the catalogue, 5,004; of volumes bound, 200; and of loans made, 2,156. The reference service of the library was unusually large, both to Smithsonian scientists and to students and others outside the Institution.

ASTROPHYSICAL OBSERVATORY LIBRARY

The library of the Astrophysical Observatory is a working collection of 4,357 volumes and 3,467 pamphlets, chiefly on astrophysics and meteorology. The accessions for the year were 169 volumes and 275 pamphlets. The number of periodicals entered was 951, and of publications obtained in exchange by special request 84. The loans were 106.

RADIATION AND ORGANISMS LIBRARY

The library of radiation and organisms, begun in 1929, was increased during the year by 96 volumes. Among these was almost a complete set of Science, which was made up largely from duplicates already in the possession of the Institution. The number of publications received in exchange in response to special requests was 43. The periodicals entered were 658. The library now has 190 volumes, 9 pamphlets, and 6 charts.

LANGLEY AERONAUTICAL LIBRARY

The Langley aeronautical library, which for the most part has been on deposit since 1930, under its own name and bookplate, in the aeronautical division of the Library of Congress, was collected chiefly by Secretary Langley of the Smithsonian while he was carrying on his well-known experiments and researches in aeronautics. Some of the more important items were once the property of other aeronautical pioneers, especially Alexander Graham Bell, Octave Chanute, and James Means. The collection has files of the early aeronautical magazines and many photographs, letters, and newspaper clippings. It numbers 1,908 volumes and 1,086 pamphlets. The library was increased during the year by 52 volumes, 623 parts of volumes, and 30 pamphlets.

NATIONAL GALLERY OF ART LIBRARY

The library of the National Gallery of Art is a carefully selected collection of 1,334 volumes and 1,416 pamphlets, mainly on American and European art. In 1932 it was increased by 91 volumes and 84 pamphlets. Among the accessions were Enciclopedia Italiana, Volumes I–XIII; Die Propyläen-kunstgeschichte, Volumes I–XV; and Life Portraits of George Washington, by John Hill Morgan and Mantle Fielding. The periodicals entered were 387. As usual, most of the routine work was done by the general library staff.

FREER GALLERY OF ART LIBRARY

The library of the Freer Gallery of Art consists chiefly of publications on the arts and cultures of the Far East, India, Persia, and the nearer East. Many of these, some of which are very rare, are not to be found elsewhere in Washington. The collection also has numerous works on some of the American painters, notably James McNeill Whistler, and on the famous Washington manuscripts of the Bible. The additions to the main collection during 1932 were 254 volumes and 163 pamphlets. At the close of the year it numbered 4,677 volumes and 3,311 pamphlets, while the special collection used by the field staff in connection with the gallery's archeological work contained approximately 800 volumes and 500 pamphlets. The number of volumes bound was 21. The work of reclassifying and recataloguing the library was completed, except for various publications in Japanese and Chinese. The catalogue and shelf list were increased by 3,507 cards, and 2,666 cards were prepared for filing in the union catalogue at the Smithsonian Institution.

NATIONAL ZOOLOGICAL PARK LIBRARY

The library of the National Zoological Park numbers 1,221 volumes and 410 pamphlets; the additions in 1932 were 4 volumes and 3 pamphlets.

SUMMARY OF ACCESSIONS

The accessions for the year may be summarized as follows:

Library	Volumes	Pamphlets and charts	Total
Astrophysical Observatory	169	275	444
Bureau of American Ethnology	400	150	550
Freer Gallery of Art	254	163	417
Langley aeronautical	52	30	82
National Gallery of Art	91	84	175
National Zoological Park	4	3	7
Radiation and Organisms	96	0	96
Smithsonian deposit, Library of Congress	2,872	3,063	5,935
Smithsonian office	132	47	179
United States National Museum	2,737	833	3,570
Total	6,807	4,648	11,455

On June 30, 1932, the Smithsonian library system contained approximately the following:

Volumes	584,864
Pamphlets	196,945
Charts	26,526
Total	808,335

The system also had many thousands of volumes still uncatalogued or incomplete.

UNION CATALOGUE

In addition to cataloguing the current items as they came in, the staff made considerable progress in recataloguing the botanical collection of the National Museum, and almost finished the reclassifying and recataloguing of the library of the Freer Gallery of Art.

The following statistics will show the work on the union catalogue and shelf list:

Volumes catalogued	4,922
Volumes recatalogued	13
Pamphlets catalogued	2,733
Pamphlets recatalogued	3
Charts catalogued	197
Typed cards added to catalogue and shelf list	9,848
Library of Congress cards added to catalogue and shelf list	13,208
Museum cards copied for union shelf list	1,741
Freer cards prepared for union catalogue and shelf list, to be added later	2,666

SPECIAL ACTIVITIES

Still further progress was made during the year in putting the scientific duplicates in the west stacks in order. The shelves of the botanical library were completely rearranged. About 50 sacks of the publications of the Institution and its branches, which had been returned as duplicates from various libraries throughout the country, were opened and their items examined and grouped. As a result, thousands of publications were sent back to stock for redistribution, and nearly 250 that were out of print were found for the sets that the library system has been trying for many years to complete. Duplicates were exchanged with several institutions, and many publications not needed by the Smithsonian or its bureaus were turned over to other Government libraries.

The librarian lectured several times in Washington and Baltimore on Washington the Man of Books and Patron of American Letters. In the course of his remarks he called attention to two matters of especial interest to the Smithsonian Institution. One was the gift of a set of Histoire Generale des Voyages, in 20 volumes, from the Marquis de Rochambeau to Washington, which on its way to the United States was captured on the high seas by a British cruiser and taken to England. It was later found in a London book shop by Prof. George Brown Goode, then Assistant Secretary of the Institution, brought to America, and presented to Mount Vernon, where it now reposes in Washington's library. The other was a letter that Washington wrote to Jonathan Edwards on August 28, 1788, thanking him for a copy of his recent book entitled "Observations on the Language of the Muhhekaneew Indians." In this letter Washington said: "I have long regretted that so many Tribes of the American Aborigines should have become almost or entirely extinct, without leaving such vestiges, as that the genius and idiom of their language might be traced. Perhaps, from such sources, the descent or kindred of nations, whose origins are lost in remote antiquity or illiterate darkness, might be more rationally investigated, than in any other mode." Thus the many-sided Washington showed himself one of the first men in our country to realize the great importance of the preservation and study of the languages of the North American Indians as a means of tracing the history of these early people.

IMPORTANT BEGINNINGS

Toward the close of the year a beginning was made in reorganizing the order division of the library with a view to developing a more modern and efficient procedure and one more closely related to that in the other divisions. Plans were also worked out for making a file of the library's exchange relations, to the end of having imme-

diately at hand for the use of the periodical division, especially the correspondence section, full data pertaining to the library's exchanges and of facilitating the more frequent revision of its exchange lists in keeping with the needs of stricter economy. And, perhaps most important of all, arrangements were completed for preparing an index to the publications of the Smithsonian Institution, National Museum, Astrophysical Observatory, and Bureau of American Ethnology. This will be a dictionary index and will at first be on Library of Congress cards. Cards for all the publications, except volumes 1 to 36 of the Proceedings of the National Museum, are already available, and the Smithsonian library staff will soon set about supplying manuscript to the Library of Congress for the printing of cards for these volumes. It is hoped that if some day the Institution is in position to publish the index, the material for it will be ready. The need for such an index is, of course, apparent to everyone.

Respectfully submitted.

WILLIAM L. CORBIN, *Librarian.*

Dr. CHARLES G. ABBOT,
Secretary, Smithsonian Institution.

APPENDIX 11

REPORT ON PUBLICATIONS

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and the Government bureaus under its administrative charge during the year ending June 30, 1932:

As announced last year, the three editorial offices formerly existing under the Institution have been consolidated into one central office under the general direction of the editor of the Smithsonian. This arrangement has proved to be very satisfactory; it has produced a more uniform style and greater accuracy in the different series published by the Institution, has speeded up the appearance of the publications, and has centralized the business operations connected with the Institution's editorial work.

PUBLICATIONS ISSUED DURING THE YEAR

The Institution proper published during the year 17 papers in the series of Smithsonian Miscellaneous Collections, 1 annual report and pamphlet copies of the 29 articles contained in the report appendix, Volume V of the Annals of the Astrophysical Observatory, and 3 special publications. The United States National Museum issued 1 annual report, 2 volumes of proceedings, 5 complete bulletins, 3 parts of bulletins, 1 paper in the series Contributions from the National Herbarium, and 53 separates from the proceedings. The Bureau of American Ethnology published 7 bulletins.

Of these publications, there were distributed 204,240 copies, which included 118 volumes and separates of the Smithsonian Contributions to Knowledge, 44,057 volumes and separates of the Smithsonian Miscellaneous Collections, 30,560 volumes and separates of the Smithsonian Annual Reports, 6,061 Smithsonian special publications, 101,975 volumes and separates of the various series of the National Museum publications, 22,867 publications of the Bureau of American Ethnology, 49 publications of the National Gallery of Art, 70 publications of the Freer Gallery of Art, 1,041 volumes of the Annals of the Astrophysical Observatory, 50 reports of the Harriman Alaska Expedition, and 699 reports of the American Historical Association.

SMITHSONIAN MISCELLANEOUS COLLECTIONS

Of the Smithsonian Miscellaneous Collections, volume 82, 1 paper and title-page and table of contents were issued; volume 85, 8 papers and addendum to number 4; volume 86, whole volume; and volume 87, 7 papers, making 17 papers in all, as follows:

VOLUME 82

No. 11. Recently dated Pueblo ruins in Arizona, by Emil W. Haury and Lyndon L. Hargrave. 120 pp., 27 pls., 35 text figs. (Publ. 3069.) August 18, 1931.

Title-page and table of contents. (Publ. 3132.)

VOLUME 85

No. 4. Mexican mosses collected by Brother Arsène Brouard—III, by I. Thériot. 44 p., 22 text figs. (Publ. 3122.) August 25, 1931.

Addendum. Index to papers by I. Thériot on Mexican mosses collected by Brother Arsène Brouard published by the Smithsonian Institution.

No. 5. Infra-red absorption bands of hydrogen cyanide in gas and liquid, by F. S. Brackett and Urner Liddel. 8 pp., 5 figs. (Publ. 3123.) August 5, 1931.

No. 6. Morphology of the insect abdomen. Part I. General structure of the abdomen and its appendages, by R. E. Snodgrass. 128 pp., 46 text figs. (Publ. 3124.) November 6, 1931.

No. 7. Effectiveness in nature of the so-called protective adaptations in the animal kingdom, chiefly as illustrated by the food habits of Nearctic birds, by W. L. McAtee. 201 pp. (Publ. 3125.) March 15, 1932.

No. 8. Modern square grounds of the Creek Indians, by John R. Swanton. 46 pp., 5 pls., 15 text figs. (Publ. 3126.) November 11, 1931.

No. 9. The determination of ozone by spectrobolometric measurements, by Oliver R. Wulf. 12 pp., 3 pls., 5 text figs. (Publ. 3127.) November 30, 1931.

No. 10. Human hair and primate patterning, by Gerrit S. Miller, jr. 13 pp., 5 pls. (Publ. 3130.) December 19, 1931.

No. 11. Supplementary notes on body radiation, by L. B. Aldrich. 12 pp., 5 text figs. (Publ. 3133.) February 2, 1932.

VOLUME 86

(Whole volume.) Smithsonian Meteorological Tables. Fifth revised edition. 282 pp., 1 text fig. (Publ. 3116.) January 11, 1931.

VOLUME 87

No. 1. The botanical collections of William Lobb in Colombia, by Ellsworth P. Killip. 13 pp. (Publ. 3133.) February 4, 1932.

No. 2. A Miocene long-beaked porpoise from California, by Remington Kellogg. 11 pp., 4 pls. (Publ. 3135.) January 22, 1932.

No. 3. Seth Eastman: The master painter of the North American Indian, by David I. Bushnell, jr. 18 pp., 15 pls., 1 text fig. (Publ. 3136.) April 11, 1932.

No. 4. The periodometer: An instrument for finding and evaluating periodicities in long series of observations, by C. G. Abbot. 6 pp., 1 pl., 1 text fig. (Publ. 3138.) February 6, 1932.

No. 5. The narrative of a southern Cheyenne woman, by Truman Michelson. 13 pp. (Publ. 3140.) March 21, 1932.

No. 6. Composition of the Caddoan linguistic stock, by Alexander Lesser and Gene Weltfish. 15 pp. (Publ. 3141.) May 14, 1932.

No. 8. Graphic correlation of radiation and biological data, by F. S. Brackett. 7 pp. (Publ. 3170.) May 17, 1932.

No. 9. Periodicity in solar variation, by C. G. Abbot and Gladys T. Bond. 14 pp., 2 pls., 8 text figs. (Publ. 3172.) May 24, 1932.

SMITHSONIAN ANNUAL REPORT

Report for 1930.—The complete volume of the Annual Report of the Board of Regents for 1930 was received from the Public Printer in December, 1931.

Annual Report of the Board of Regents of the Smithsonian Institution showing the operations, expenditures, and condition of the Institution for the year ending June 30, 1930. xii+650 pp., 191 pls., 57 text figs. (Publ. 3077.)

The appendix contained the following papers:

Beyond the red in the spectrum, by H. D. Babcock.

Growth in our knowledge of the sun, by Charles E. St. John.

The modern sun cult, by J. W. Sturmer.

The moon and radioactivity, by V. S. Forbes.

Modern concepts in physics and their relation to chemistry, by Irving Langmuir.

Waves and corpuscles in modern physics, by Louis de Broglie.

New researches on the effect of light waves on the growth of plants, by F. S. Brackett and Earl S. Johnston.

The Autogiro: Its characteristics and accomplishments, by Harold F. Pitcairn.

Ten years' gliding and soaring in Germany, by Prof. Dr. Walter Georgii.

The first rains and their geological significance, by Assar Hadding.

Weather and glaciation, by Chester A. Reeds.

Wild life protection: An urgent problem, by Ernest P. Walker.

The nesting habits of Wagler's Oropendola on Barro Colorado Island, by Frank M. Chapman.

The rise of applied entomology in the United States, by L. O. Howard.

Man and insects, by L. O. Howard.

The use of fish poisons in South America, by Ellsworth P. Killip and Albert C. Smith.

A rare parasitic food plant of the Southwest, by Frank A. Thackery and M. French Gilman.

The mechanism of organic evolution, by Charles B. Davenport.

Extra chromosomes, a source of variations in the Jimson Weed, by Albert F. Blakeslee.

The age of the human race in the light of geology, by Stephen Richarz.

Elements of the culture of the circumpolar zone, by W. G. Bogoras.

The Tell en-Nasbeh Excavations of 1929—a preliminary report, by William Frederic Badé.

Recent progress in the field of Old World prehistory, by George Grant MacCurdy.

Ancient seating furniture in the collections of the United States National Museum, by Walter Hough.

Aspects of aboriginal decorative art in America based on specimens in the United States National Museum, by Herbert W. Krieger.

The acclimatization of the white race in the Tropics, by Robert De C. Ward.

The eighth wonder: The Holland Vehicular Tunnel, by Carl C. Gray and H. F. Hagen.

Jesse Walter Fewkes, by John R. Swanton and F. H. H. Roberts, jr.

George Perkins Merrill, by Charles Schuchert.

Report for 1931.—The report of the executive committee and proceedings of the Board of Regents of the Institution and the report of the Secretary, both forming parts of the annual report of the Board of Regents to Congress, were issued in December, 1931.

Report of the executive committee and proceedings of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1931. 12 pp. (Publ. 3129.)

Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1931. 159 pp., 2 pls., 9 text figs. (Publ. 3128.)

The Report volume, containing the general appendix, was in press at the close of the year.

ASTROPHYSICAL OBSERVATORY PUBLICATIONS

Annals of the Astrophysical Observatory, Vol. V, by C. G. Abbot, L. B. Aldrich, and F. E. Fowle. 295 pp., 9 pls., 33 text figs. (Publ. 3121.) April 20, 1932.

FREER GALLERY OF ART PUBLICATIONS

The Freer Gallery of Art. 5 pp. (Fourth printing.) August 6, 1932.

SPECIAL PUBLICATIONS

Explorations and field work of the Smithsonian Institution in 1931. 190 pp., 182 figs. (Publ. 3134.) April 21, 1932.

Handbook of the National Aircraft Collection exhibited in the United States National Museum under the direction of the Smithsonian Institution, by Paul Edward Garber. Fourth edition. 32 pp., 38 illustrations. (Publ. 3139.) April 5, 1932.

Smithsonian Mathematical Tables—Hyperbolic Functions. Prepared by George F. Becker and C. E. Van Orstrand. Fourth reprint. 321 pp. (Publ. 1871.) October 23, 1931.

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM

The editorial work of the National Museum has continued during the year under the immediate direction of the editor, Paul H. Oehser. There were issued 1 annual report, 2 volumes of proceedings, 5 complete bulletins, 3 parts of bulletins, 1 paper in the series Contributions from the National Herbarium, and 53 separates from the proceedings.

The issues of the bulletin were as follows:

Bulletin 100, vol. 2. Papers on collections gathered by the *Albatross* Philippine expedition, 1907–1910.

Bulletin 104. The Foraminifera of the Atlantic Ocean. Part 8. Rotaliidae, Amphisteginidae, Calcarinidae, Cymbaloporettidae, Globorotaliidae, Anomalinidae, Planorbulinidae, Rupertiidae, and Homotremidae, by Joseph Augustine Cushman.

Bulletin 156. Aboriginal Indian pottery of the Dominican Republic, by Herbert W. Krieger.

Bulletin 157. The butterflies of the District of Columbia and vicinity, by Austin H. Clark.
Bulletin 159. The birds of the Natuna Islands, by Harry C. Oberholser.
Bulletin 160. Mexican tailless amphibians in the United States National Museum, by Remington Kellogg.
Bulletin 161. The Foraminifera of the Tropical Pacific collections of the *Albatross*, 1899–1900. Part 1.—Astrorhizidae to Trochamminidae, by Joseph A. Cushman.
Bulletin 162. Life histories of North American Gallinaceous birds. Orders Galliformes and Columbiformes, by Arthur Cleveland Bent.

The following paper was issued in the series Contributions from the National Herbarium:

Volume 28, Part 2. The American species of Thibaudieae, by Albert C. Smith.

Of the separates from the proceedings, 28 were from volume 79, 21 from volume 80, and 4 from volume 81.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY

The editorial work of the bureau has continued under the immediate direction of the editor, Stanley Searles. During the year seven bulletins were issued, as follows:

Bulletin 94. Tobacco among the Karuk Indians of California (Harrington). xxxvi+284 pp., 26 pls., 3 figs.
Bulletin 98. Tales of the Cochiti Indians (Benedict). x+256 pp.
Bulletin 102. Menominee music (Densmore). xxii+230 pp., 27 pls., 3 figs.
Bulletin 103. Source material for the social and ceremonial life of the Choctaw Indians (Swanton). vii+282 pp., 6 pls., 1 fig.
Bulletin 104. A survey of prehistoric sites in the region of Flagstaff, Arizona (Colton). vii+68 pp., 10 pls., 1 fig.
Bulletin 105. Notes on the Fox Wâpanōwiweni (Michelson). v+195 pp. 1 fig.
Bulletin 107. Karuk Indian myths (Harrington). v+34 pp.

REPORT OF THE AMERICAN HISTORICAL ASSOCIATION

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution and are communicated by him to Congress, as provided by the act of incorporation of the association.

The annual report for 1930, volume 1, and the supplemental volume to the report for 1928 were issued during the year. The annual reports for 1930, volumes 3 and 4, and 1931, volume 1, and the supplemental volume to the report for 1929 were in press at the close of the year.

REPORT OF THE NATIONAL SOCIETY, DAUGHTERS OF THE AMERICAN REVOLUTION

The manuscript of the Thirty-fourth Annual Report of the National Society, Daughters of the American Revolution, was transmitted to Congress, in accordance with law, November 9, 1931.

ALLOTMENTS FOR PRINTING

The congressional allotments for the printing of the Smithsonian report to Congress and the various publications of the Government bureaus under the administration of the Institution were virtually used up at the close of the year. The appropriation for the coming year ending June 30, 1933, totals $60,000, allotted as follows:

Annual report to the Congress of the Board of Regents of the Smithsonian Institution	$8,850
National Museum	23,250
Bureau of American Ethnology	14,500
National Gallery of Art	100
International Exchanges	100
International Catalogue of Scientific Literature	50
National Zoological Park	150
Astrophysical Observatory	1,000
Annual report of the American Historical Association	12,000

Respectfully submitted.

W. P. True, *Editor.*

Dr. Charles G. Abbot,
Secretary, Smithsonian Institution.

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